

October 16, 1961

PULP & PAPER



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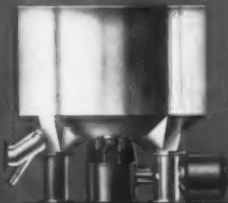
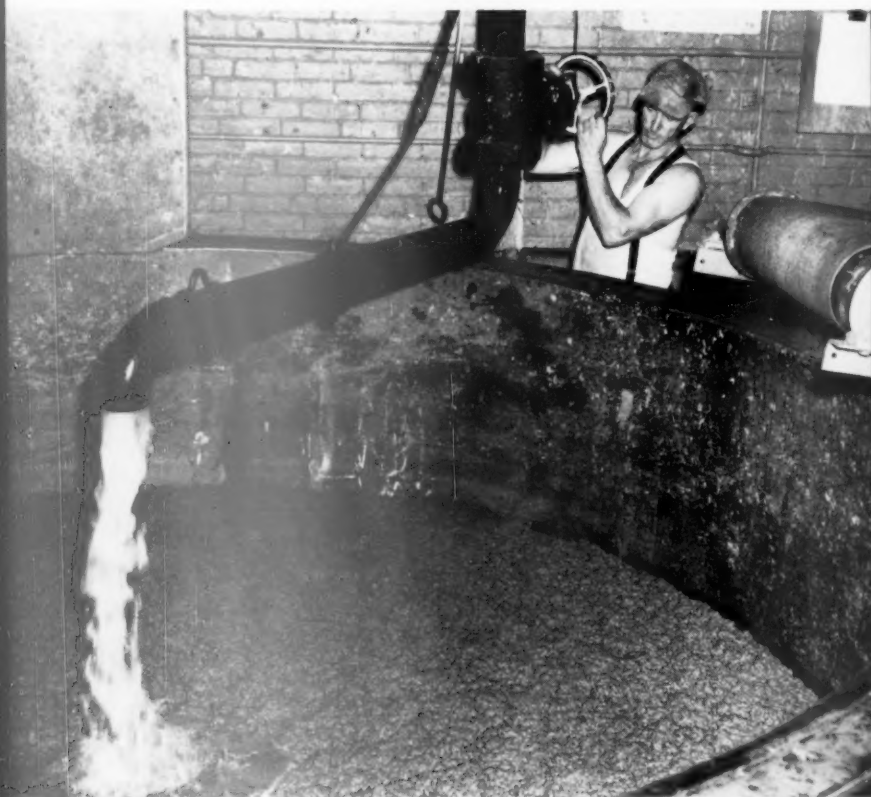
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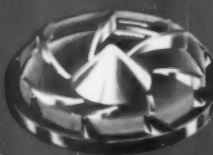


"The Emerson Dualator does the best defibering job of any equipment we know about"

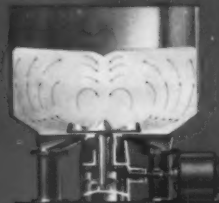
says David W. Peat, Manager of Manufacturing of the Gilman Paper Company, Gilman, Vermont.



The Emerson Dualator



... employs contra-rotating rotors which form a cylindrical zone of positive defibering action



... and develops a distinctive radial stock flow.

NEW EMERSON DUALATOR REDUCES DEFIBERING TIME AND ENERGY INPUT AT GILMAN

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The revolutionary design of the new Emerson Dualator reduces the defibering time and energy input of conven-

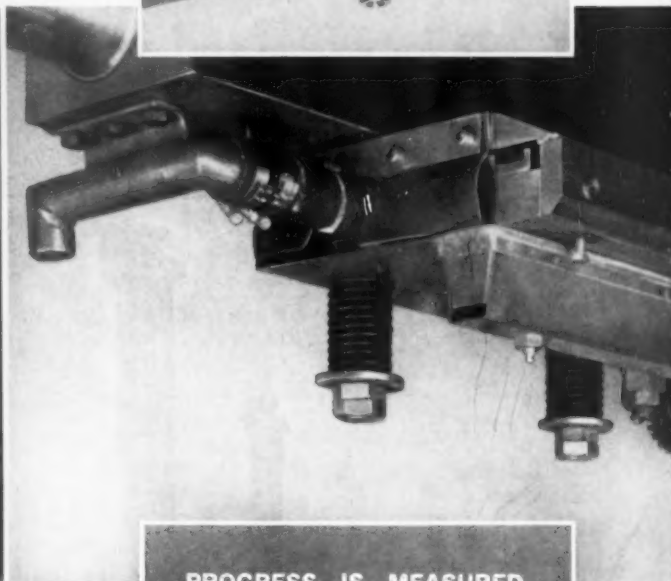
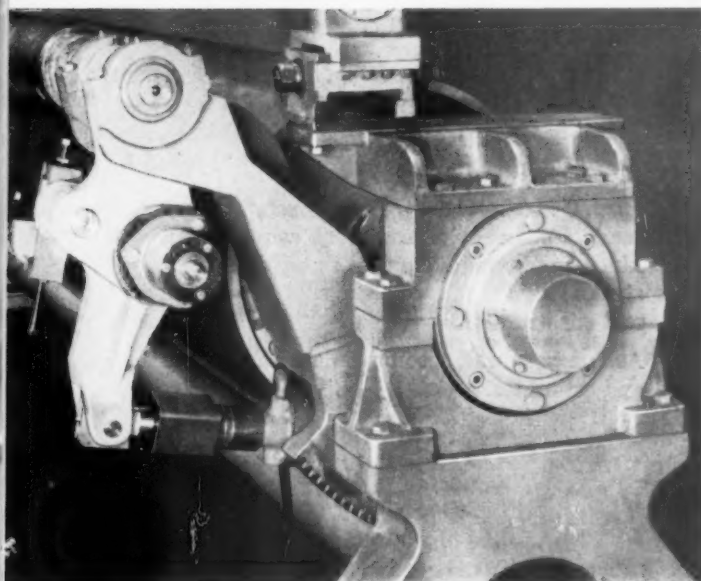
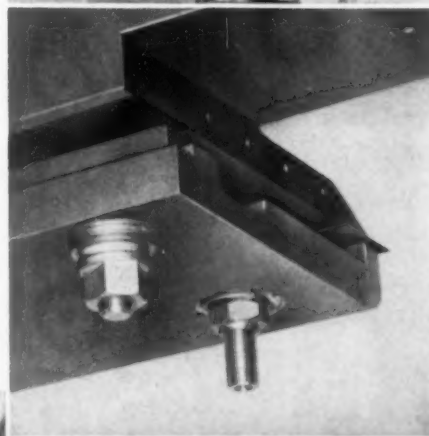
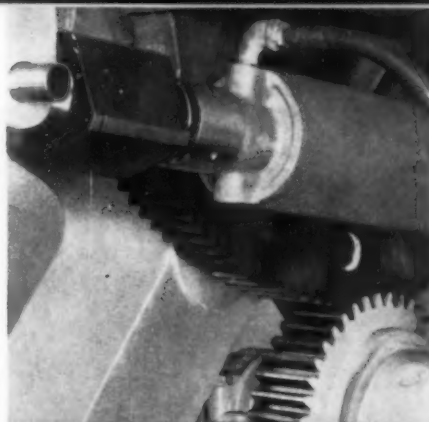
tional pulpers by at least one half. With contra-rotating rotors, energy is converted to productive pulping. None is wasted in needless circulation. This means more tons/day of complete, efficient defibering. It permits the use of smaller tubs and, in many instances, reduces or eliminates the necessity of using chemicals and/or heat. A distinctive radial flow pattern develops from the interaction of the two rotors, which permits operation at as little as 25% of tub capacity with no splashing.

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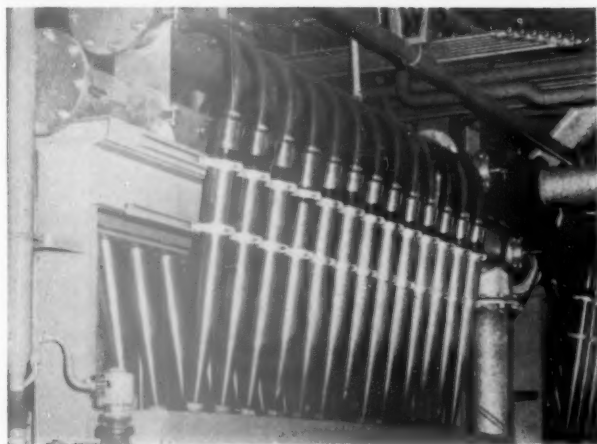
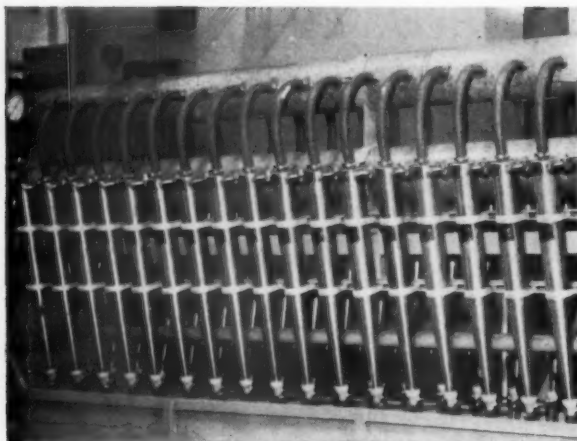
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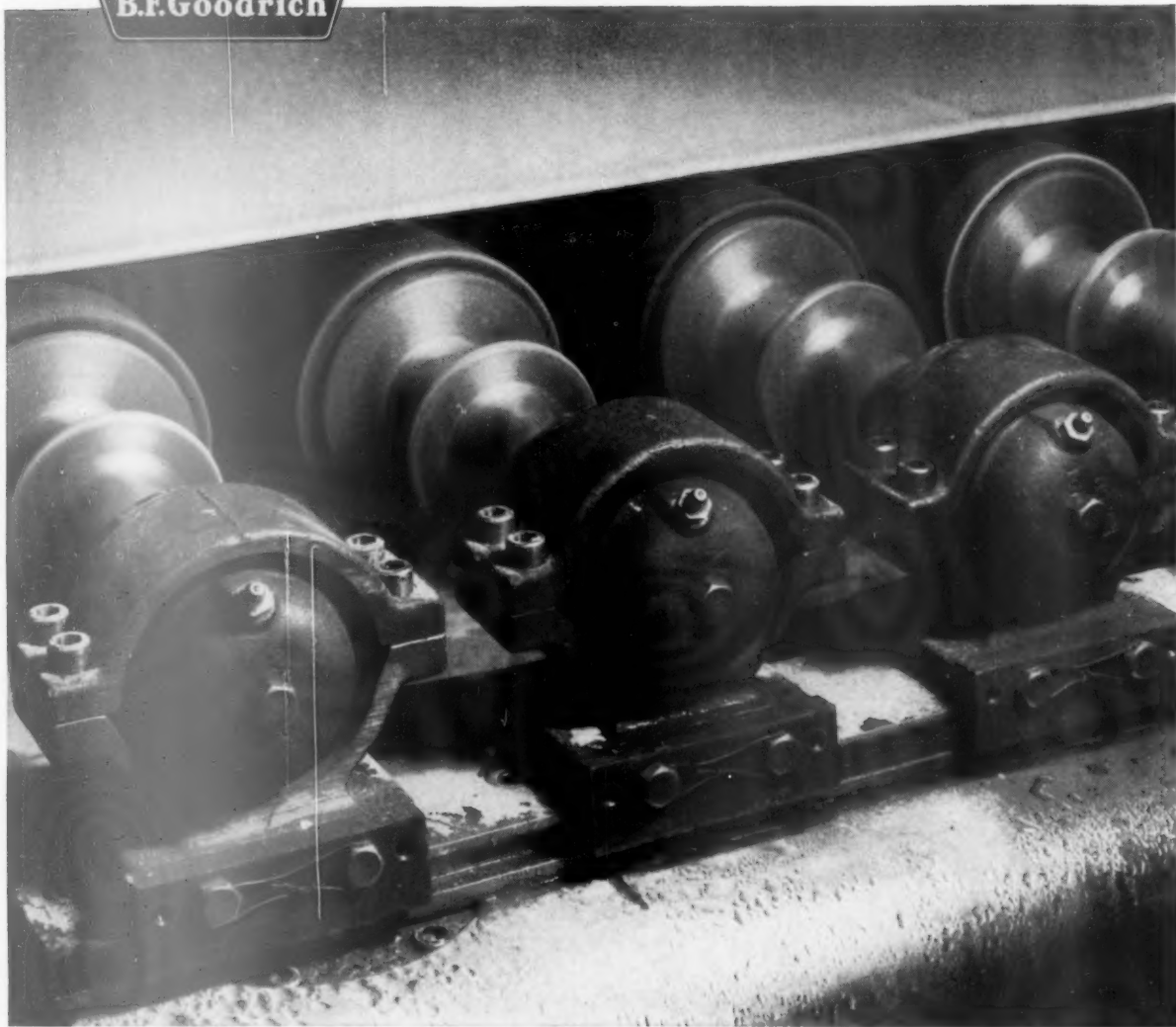
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NEWS DIGEST...

Firmer paper and board operating rates

are being reported as the national economy and the industry step into high gear for the fourth quarter. At the end of September, paper was operating at an annual rate of 92.7 and paperboard at 89%.

Industry profit trend is reversing

and overall figures for year may show gains, says Crown Zellerbach's J. D. Zellerbach. He also sees positive advantages to U.S. and Canada in Britain joining the Common Market. See "Industry Growth," page 9.

New high grade tissue mill

moves into operation as Patrician Paper Co., Inc. at South Glens Falls, N.Y., starts up. High yield success spurs expansion at Powell River plant of MB&PR. See "Industry Growth," page 11.

Momentum and confidence dominate

almost every aspect of the business community as corporate profits rise. GNP moves up to record highs and capital spending climbs to annual rate of \$35.9 billion for fourth quarter. Still lagging behind is retail sales. See "Business," page 17.

Newsprint capacity may outstrip demand

in western North America, reports Powell River Alberni Sales, Ltd. Based on a survey, it sees surplus capacity increasing to about 270,000 tons by 1965. See "Business," page 19.

Independent paper merchants strengthened

their position as the result of mill-merchant mergers, says Consolidated's Harold Murtfelt. He also predicts that within 15 years paper merchants will sell 500,000 tons more of coated paper than in 1950. He forecasts 5%/year growth in coated printing papers. See "Business," page 19.

Canada's pulp-paper backs UK's entry

into Common Market, taking opposing stand to its government's efforts. Industry sees greater gains in broadening of trade not only with Great Britain, but also with extension of free trade principle among other countries. See "International," page 19.

Less land will have to do more work

to meet expected future demands and this is why the forest industries sponsored a conference on land use management in Washington in September. Surprising to many was the fact that the meeting took place in a very friendly atmosphere, and although no problems per se were solved, many industry executives say an excellent start was made. See "Pulpwood Management," page 29.

Groundwood pulping is making strides

whether produced conventionally by stones or by refiners. Developments to watch: groundwood-from-chips on West Coast, the Bersano rotational grinder and pitless grinding. For a report on new trends, see special story on the Fourth Mechanical Pulping Conference, page 68.

..... COATING

Why Great Northern will coat

It has unused groundwood capacity, much timber, cheap power

NEW YORK—A new entry into blade coating has put the whole coated and uncoated field into a wild scramble. The entry: Great Northern Paper Co., major independent U.S. newsprint producer.

Significance of The Northern's move into coated publication grades can be better understood by looking at a list of those mills who are already in this fast growing field and those

who are about to come in. All but one are using the blade coater.

Blandin began the battle of the blades in 1955 when it switched from a 100% groundwood specialty mill to a 100% coating operation to produce coated publication papers for Look magazine. Current competition now includes: Consolidated Water Power & Paper Co., probably the na-

tion's biggest coating mill; Crown Zellerbach Corp. St. Francisville; International Paper Co.; West Virginia Pulp and Paper Co.; St. Regis Paper Co.; Kimberly-Clark Corp.; New York and Pennsylvania Co., Inc.; possibly Scott Paper Co.; Bowaters and Great Northern. The latter two are scheduled to come into production about the last quarter of 1962.

Urgency behind the Northern's

Paper sculpture by Giuseppe Baggi



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move is underlined in the statement that "construction will start at once and production is scheduled to begin in the last quarter of 1962." Here are some of Great Northern's motives. It has considerable excess groundwood capacity at its 10-machine Millinocket, Maine mill. Coated publication paper is a grade that uses considerable groundwood (about 70% of the furnish). In addition, Great Northern has considerable power facilities at Millinocket, installed a new power plant there late in 1958. It has tremendous reserves of wood (it owns something like 2½ million acres of timberlands in Maine).

Then consider the newsprint market. There is considerable overcapac-

ity. Great Northern's machines at Millinocket are not in the same class as its newer machines at East Millinocket, nor can it compete on the same footing as the new Southern newsprint machines.

Six of the Millinocket machines were modernized in 1958 with new differential drives boosting their speed range up to about 1800 fpm. These machines are 152 in. wide. The other four machines which complete the Millinocket production team are 158 in. wide.

Great Northern will install an off-machine blade coater. It will probably be about 150 in. wide and designed for 3,000 fpm with a capacity between 70,000 to 80,000 tons per year.

Behind the rush to blade coating is the mortal combat among consumer magazines McCall's, SatEvePost, Ladies Home Journal, Look, Life, etc. The stakes are big. In the battle to attract the advertising dollar, publishers are waging a war to push circulation to the eight million mark and are seeking greater print quality at less cost. Newer, faster and wider paper machines with high speed coating (above 2,000 fpm) are one answer to this problem.

There is considerable speculation that Great Northern may have signed up a large publisher before making the decision to get into coating. This is what Bowaters did when it started up its Calhoun, Tenn. newsprint

Who's Who in Blade-Coated Publication Grades

Company	Mill	On or Off Machine	Width	Capacity	Remarks
Blandin Paper Co.	Grand Rapids	Off	113		
		Off	158		
		Off	145		Due in 1964
Bowaters Carolina	Catawba, S.C.	Off	228	75,000	Late 1962
Consolidated	Wisconsin R.	On	135		
	Biron	Off	198		
	Biron	On	148		
Crown Zellerbach	West Linn	On	165	—	
		On	165	—	
Great Northern	Millinocket	Off	150 E	75,000E	Late 1962
International Paper	Otis	Off	142		
	Corinth	On	153		1962
Kimberly-Clark	Kimberly Niagara, Wis.	On			
		On			(K-C has five on-machine blade coaters; 2 at Kimberly; 3 at Niagara. Latest at Niagara is 168 in coming on line early 1962 with 50,000 tons capacity.)
New York and Penn	Lock Haven	Off	155		
	Johnsonburg	On	198		
Oxford Paper Co.	Rumford	Off	150		
St. Francisville	St. Francisville	On	264	80,000	
	St. Francisville	On	264	80,000	This machine just announced.
St. Regis Paper	Deferiet	Off	220		Just started up.
West Virginia	Luke	On	226	85,000	
		On	226	85,000	
The Mead Corp.	Escanaba	On	172		
	Escanaba	Off	172		
Provincial Paper (Canada)	Port Arthur	Off	162		3,000 fpm

Notes: This list has been compiled by PULP & PAPER from various industry sources. Because of the very nature of the subject, some "guesstimates" have been made to make this list as complete as possible. In addition to the mills listed above, Newton Falls Paper Mill has started up a new off-machine blade coater, but its grades are considered in the specialty printing grade class. Scott Paper Co.'s Mobile, Ala. mill has started up a new on-machine coating operation and there is some talk that blade coating may be used.

... Fluid Power news

OILGEAR
40
Years of Fluid Power

Report No. 12,107

From Oilgear Application-Engineering Files

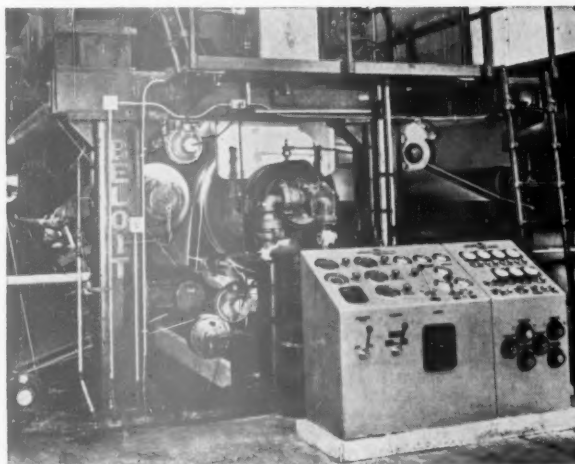
HOW HYTAC* SYSTEMS CONTROL NEW EXTENSIBLE PAPER MACHINE SECTION SPEEDS IN 12 MILLS

USERS: Twelve Paper Companies—Licensed by CLUPAK, INC.

Builder—Sections and Differential Drives—Beloit Iron Works, Beloit, Wisconsin

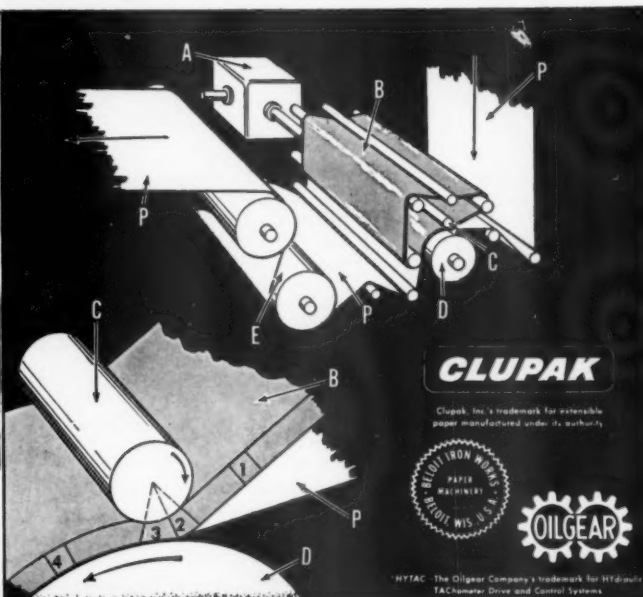
DATA: Systems to vary and precisely control speed and draw of new sections that can be an integral part of complete, new paper machines, or inserted into existing machines for production of CLUPAK® extensible paper—a revolutionary, patented, smooth, tough, kraft sheet. Original requirements called for systems that, when applied to Beloit mechanical differentials, would: 1. Provide precision-controlled, infinitely variable section speed decrease up to 10% under main lineshaft speed—as selected from remote pushbutton stations. 2. Maintain selected section

speed within $\pm 0.25\%$ max. variation over a 50% load change at max. lineshaft speed. 3. Be: compact; impervious to heat, high humidity; thrifty on electrical power input, wiring, installation downtime, floor space; completely free, if possible, from maintenance-provoking belts, chains, relays. 4. Insure trouble-free, continuous, heavy-duty, full-production paper machine drive service—but permit section immobilization for production of non-extensible stock. 5. One source and responsibility for these speed and draw controls preferred.



One of the most recent of the twelve new Beloit extensible sections and control consoles incorporating HYTAC* SYSTEMS for precise speed and draw control—as installed on No. 1 machine at International Paper Company's Southern Kraft Division Mill, Camden, Arkansas, to produce CLUPAK® extensible paper. Control console instrumentation includes direct-reading hydraulic pressure gauges from the OILGEAR System to provide operators with constant, visual, exact indication of load or draw on the section.

SOLUTION: Application-Engineered HYTAC* (HYdraulic TACHometer) controlled differential drives consisting of Oilgear "DRT-3517" Variable Displacement Pumps, "H-6017" Constant Displacement Motors, and HYTAC* components with remote pushbutton control to provide precise speed-draw control on Beloit extensible sections installed and commercially producing CLUPAK® extensible paper at nine mills in the United States, two in Canada, and one in Sweden. Several other paper manufacturers licensed by CLUPAK, Inc., to produce extensible paper under its authority, now have these Oilgear-equipped Beloit extensible sections on order. Oilgear HYTAC* Drive-Control Systems were selected after 3 years of development on this process and machine—from a 2-in. table model, through a 15-in. laboratory model, and a 60-in. pilot model—as best suited to provide the accuracy and range of control required for the variable speed drives. Actual commercial operation has proved that these highly accurate, compact, heavy-duty, Oilgear Systems can maintain any selected section speed with less than $\pm 0.25\%$ variation regardless of load change over a 10:1 range of lineshaft rpm—plus enabling operators to infinitely vary each section's drive rpm up to 15% under main lineshaft rpm . . . exceeding originally specified requirements!



HOW IT WORKS: Section driven by Oilgear-equipped Beloit differential (A), consists of a 1-in. thick natural rubber Blanket (B) operating over 3 rolls, and between Nip Roll (C) and steam-heated, polished, chrome plated Dryer Drum (D). Paper (P) is held between Blanket (B), slipping against Dryer Drum (D). Enlarged view at Nip Roll shows how normal (1) Blanket (B) is compressed (2), squeezed and elongated (3), and rapidly contracts (4) after leaving Nip Roll—shrinking paper. Normal production shrink requirement is accurately controllable up to 15% by controlled variation in nip pressure, moisture content, dryer drum temperature. Accurate control of draw in and between extensible unit and 3rd Dryer Section (E) is required regardless of load changes . . . a reason for the precise, infinitely variable speed-draw control provided by Application-Engineered HYTAC* Systems.

Other inherent Oilgear "Any-Speed" Drive features are: cushioned, controlled starting, acceleration, deceleration, braking . . . positive, automatic overload protection . . . continuously filtered pressure and flood lubrication. Copies of Oilgear's *Fluid Power NEWS* 3, 5, 8, 9, 11—with detailed descriptions of some of these and other *Application-Proved* installations are available on request.

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operations. It had contracts with Southern newspaper publishers before it started up. It has also reportedly signed a contract with McCalls for its new mill at Catawba, S.C. which will make coated publication papers.

This line of speculation is based on the fact that Peter S. Paine, president of New York and Penn, owned by Curtis Publications (Saturday Evening Post, Ladies Home Journal, Holiday), left that company early this year to become senior vice president of Great Northern. He is expected to take over as president early next year when M. C. McDonald, present president has said he will retire. It is well known that New York and Penn is increasing its merchant tonnage. It is installing an off-machine coater at its Lock Haven Division's Castanea mill and an on-machine blade coater at Johnsonburg.

Great Northern, however, says this is pure speculation, that The Northern is out to carve a niche for itself in the blade coated publication field just as Blandin has done.

At present, about 1.9 million tons of printing papers are coated. Uncoated book papers are also at about this same level and some observers say some of this tonnage can be ex-

pected to be converted to coated grades. This is the trend. Uncoated grades have been static.

The move by Great Northern Paper Co., together with other newcomers such as Bowaters and West Virginia (which got into the field in 1954 or 1955 and is coming back in a big way with two high speed machines with four blade coaters on each), means that from these three mills alone an estimated 300,000 tons of new coated publication capacity will be added by the end of 1962.

This additional capacity from these three mills will put more pressure on the "uncommitted" mills, those with roll coaters, those without any coating at all. It may be that some serious decisions will have to be made soon—probably before year end.

Although there are some who dispute the superiority of the blade coater over the roll coater, the blade coater is today's trend, and more and more printers are asking for blade coated papers.

High speed blade coating above the 2,000 fpm level is said to improve coating results. One mill says that above the 2,000 fpm mark the blade tends to act as an orifice and you get better results. Another mill reportedly is coating experimentally high above

the 3,000 fpm mark.

There is still much to be learned about the blade coater and blade coating but with so many mills using them now and with many of them sharing their knowledge, the industry is getting some rather interesting answers almost as soon as it asks the questions.

Easiest way for the "uncommitted" mills to get into blade coating will be with an off-machine coater. This is the present trend. This is what Great Northern, Bowaters and Provincial Paper, Ltd. are doing. This does not tie down existing papermaking equipment while you are learning about coating. It does not interfere with the efficiency of your paper machine. Coating experts say that you lose about 8% efficiency for each blade that you put on the machine.

The die is now cast for Great Northern. The industry has long known of its leanings toward coating. Its technical chiefs have haunted the TAPPI coating sessions since as far back as 1954. The decision has been made at a time when overcapacity exists in the industry. Great Northern knows this. It also knows that with its production lineup at Millinocket and with the big trend to coated publication papers, it was natural that it should get into the race.

.... INDUSTRY GROWTH

Better capacity-consumption balance seen

Also, price cutting trend is reversing and year could show gains

VANCOUVER—J. D. Zellerbach, chairman of the board, Crown Zellerbach Corp., who shocked some pulp and paper leaders two years ago by warning that the industry was heading into over-production, asserts now that the turning point has been reached.

"Industry profits were down as much as 40% in some cases earlier this year," Mr. Zellerbach said in a talk before the Vancouver Board of Trade. "This was due largely to price cutting. However, the trend appears to have been reversed and the overall figures for the year could show gains. Some economists are predicting 1962 will be a boom year. Lower prices and profits in pulp and paper are only a temporary disruption, and the next few years should see a better balance between capacity and consumption."

Mr. Zellerbach, whose Crown Zel-

lerbach Canada, Ltd. represents an investment of more than \$90,000,000 in British Columbia, called for a "vigorous, new trading impulse" to stimulate a greater flow of goods and services among North American countries.

He declared: "The same forces that are pushing a reluctant Britain to join the European Common Market are working on us. With the possibility of the Common Market's enlargement to ten by the entry of Britain, Denmark, Norway and Greece, the outlook for trading nations outside this group is sober and challenging."

There are positive advantages to the U.S. and Canada in a strong European Economic Community, he averred. The underlying source of worry to the Soviet leadership, he said, is "the conspicuous and surpassing economic success of the EEC."

"As a world power, Britain is stranded, politically and economically, as long as she remains outside the surging continental community of the Six," declared Mr. Zellerbach.

"It seems a safe prediction," he continued, "that when the U.S. Trade Agreements Act comes up next year for renewal, loud and powerful complaints will be lodged in Washington against the 'discriminatory' features of the Common Market. But against this unfavorable tariff arithmetic must be placed another set of facts. Month by month, statistics are measuring an extraordinary growth of prosperity within the Common Market. People are buying hard goods. Living standards are going up."

"The buying power of the internal market has risen so fast, it is making room for new enter-

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....INDUSTRY GROWTH

prises, including Canadian and U.S. enterprises. . . . As a whole, the Six are doing better than Britain in raising their national production rates. They are doing better than the United States."

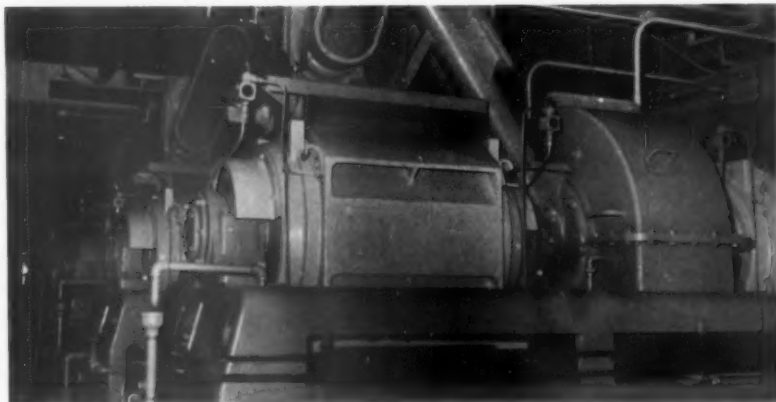
To meet the challenge, he sug-

gested that Canada and the U.S. draw together more closely the entire North Atlantic trading world. "The U.S. tariffs and quotas and peril points and escape clauses," he said, "tend to freeze progress toward the more abundant trade the Western world

needs and must have. The system overpopulates the North American trading lanes with protectionist icebergs, a peril to all. It stands in the way of giving greater economic help to countries trying to improve their position. And it ignores the future." ■

High yield sulfite expansion at Powell River

POWELL RIVER, B.C.—Wood costs reduction in excess of \$100,000 a year are expected at Powell River mill of MacMillan, Bloedel & Powell River Ltd. as a result of expansion program here in high yield sulfite pulping. Refiners added make this one of the biggest mills on high yield sulfite. System was expanded by installing eight refiners, four primaries and four secondaries, all double-disc 411 Bauers of 400-400 hp capacity. Intended capacity is 350 tpd. Production involves less, but harder, cooking in existing digesters for a yield of about 75 per cent. Resultant HYS stock is used in place of regular sulfite for making newsprint. (This system was discussed at the International Mechanical Pulp Conference. See report page 68).



REFINING CAPACITY has been expanded to 350 tpd with four double-disc refiners, making mill one of biggest on high yield sulfite.

Patrician begins tissue production

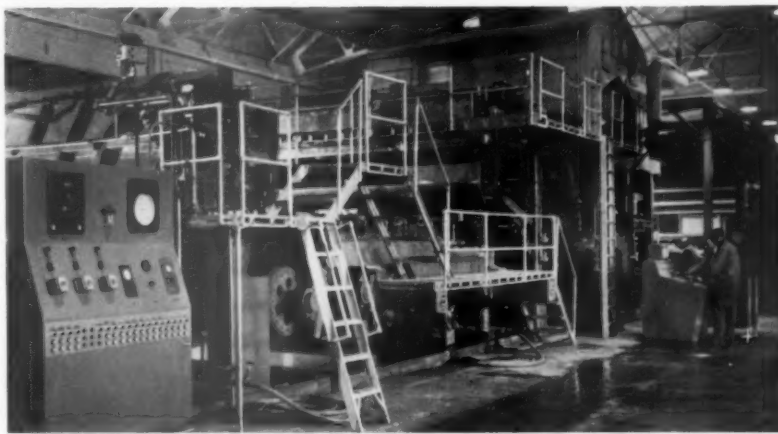
SOUTH GLENS FALLS, N.Y.—A brand new paper mill here has entered the premium grade tissue field with start-up of its 147 in. paper machine. The \$24 million plant of Patrician Paper Co., Inc., on a site formerly occupied by the Marinette division of Scott Paper Co., is within a 200-mile radius of the largest consumer markets in the world and with rail, truck and barge transportation facilities nearby.

Patrician President Edward B. Malory has had more than 25 years sales management and administrative experience in the tissue field, especially with grocery and supermarket chains. For the past 15 years he was with Angel Soft Tissue Mills, Inc., the last five as vice president.

William H. Holl, vice president i/c manufacturing, has more than 30 years of manufacturing and plant experience in the tissue paper products industry.

Alvin H. Johnson and Co. Inc. was consulting engineer for the project.

Long-fibered Canadian pulp comprises the main fiber furnish for the mill which has aimed its production at the premium facial and facial type toilet tissues markets.



NEW TISSUE MACHINE, Patrician No. 1 is now operating at Patrician Paper Mills Co., Inc. The Sandy Hill unit has speed range of 2,000 fpm for facial tissue.

The paper machine is mechanically designed to operate at 2,000 fpm and is built by Sandy Hill Iron and Brass Works. The pressurized headbox has a patented pressure control and is stainless steel with two stainless steel distributor rolls. A flexible lip slice is adjustable vertically

and horizontally. The 147 in. by 50 ft. wire is of a cantilever design and is stainless steel covered. The honeycomb-face breast roll is 30 in. diameter.

The forming table has five adjustable, wire contact-type deflectors with Ryertex lips and . . . turn to p. 15

- 
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 - VAST NATURAL RESERVES

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How to buy a better roll production system

Cameron Research can help you to avoid costly mistakes when you buy winders, slitters, unwinds, tension controls, unwind brakes and accessory roll production equipment.



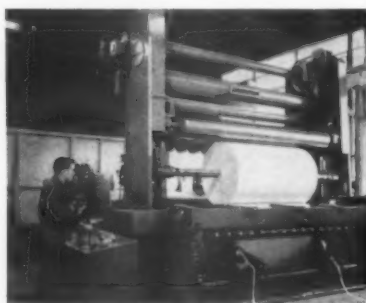
Cameron Research Service is the only facility of its kind dedicated to the roll production problems of producers and converters of paper, paperboard, films, foils and other flexible web materials of all types.

Cameron leadership in roll production research stems from a background which includes the most extensive line of roll production equipment, the most impressive and diversified record of successful experience, and the most abundant reservoir of authentic analytical research data in the field.

RESEARCH EQUIPMENT

Supported by outstanding plant facilities, Cameron Research has the additional advantage of numerous production and testing devices developed by our own engineers and not available elsewhere. Also, two departments have been fully equipped with two-drum and duplex winding systems, which are employed in engineering development studies and for actual test-runs on all types of materials.

The major interests of Cameron Research are directed toward fundamental advances that will benefit the greatest number of users. Typically, the impact of Cameron integrated unwind-to-rewind roll control has raised competitive standards everywhere. The modern *truly* integrated



An experimental mill type two-drum system, fully equipped for research and development work at Cameron's plant, Dover, N. J.



Another wing of the Cameron Research Service is devoted to a continuous study of converter type duplex and two-drum systems.

roll production system is distinctly a Cameron concept, based upon the uniquely comprehensive Cameron background.

Practical applications of Cameron Research have gone far beyond many current standards and pet theories to give Cameron users the reserve capacity, speed, and superb roll

quality they need in today's highly competitive markets. Working with many different types of materials, Cameron Research has helped our customers to increase their roll content substantially in large diameter rolls of *superb running quality*. And not with just one cut, but with any required number of cuts across the full width of the web.

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To supplement continuous projects in fundamental research, Cameron welcomes the problems of individual users. Whether you are interested in a single improvement (such as a properly fitted unwind brake), or a complete new roll production system, the responsibility of Cameron Research is to help you buy the *best* equipment for your present and future needs. Where test-runs are necessary your material will be processed from unwind to rewind under the supervision of Cameron specialists. Fully equipped, adaptable pilot systems are available for this purpose, permitting duplication of many of your actual job conditions.

If you are reaching for an unusual achievement in roll production, or if you just want help with a practical production improvement, it will pay you to call on the Cameron Research Service. Write today for more complete information.

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SELLING AGENTS

Morey Paper Mill Supply Company

309 SOUTH STREET, FITCHBURG, MASS.

John B. Chandler Co.

P.O. BOX 1748, ATLANTIC BEACH, FLA.

Tipka Supply Company

415 JACKSON ST., OREGON CITY, ORE.

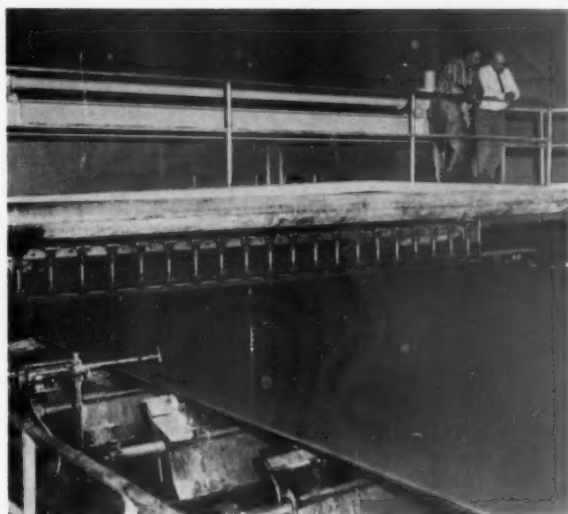
start p. 11 . . . two 16 in. dia. Sinclair dandy-type table rolls. There are two stainless steel suction boxes with maple covers with an individual separator by Clark & Vicario.

The press section has a 30 in. Man-

chester suction press roll with a 26 in. dia. pneumatically loaded rubber covered roll. The Yankee has a Ross hood and vapor handling system with a Ross-Midwest Fulton steam supply and condensate handling system. A

General Electrical sectional electric drive with control panel on the tending side drives the paper machine. A Cameron No. 460 with score-type slitters is especially designed for facial tissue slitting. ■

Two more expansion projects for Crown Z



BIG TISSUE MACHINE at Crown Zellerbach's St. Helens, Ore. division is third on Pacific Coast to be equipped with Beloit suction breast roll. Suction boxes within this new 48 in. diam. component remove water from stock to such extent that resultant mat on Fourdrinier has "dry" appearance. This machine—mill's No. 3, installed in 1955—has 249 in. trim and speeds to 3,000 fpm, is one of industry's largest for making tissue. Recent modernization resulted in improved quality and increased volume of napkin and toilet tissue, both dry-creped.



INCREASED WOOD USE from tributary tree farms will be possible after \$250,000 modification of log storage and handling facilities at Crown Zellerbach's Port Angeles, Wash. plant. Shallow-water log storage will be converted to dry storage and a canal through which bundled logs can be delivered to the mill. New deep water storage will be provided and a bridge crane installed for log handling. Use of sinkers as well as trims from market logs will then be practical by bundling them with other logs at truck dump for water haul to mill.

Provincial entering blade coating field

PORT ARTHUR, ONT.—Here is additional information to the report (PULP & PAPER, Oct. 2) that Provincial Paper, Ltd. is proceeding "at once" with installation of an off-machine blade coater.

The long-expected move will cost \$2.5 million and is Provincial's own answer to a question it has often asked of other mills: What is the roll coating mill's answer to the blade coater?

It is interesting to note that Provincial says the productive capacity being installed here at Port Arthur will be "sufficient to cover the entire Canadian demand as it now is with some surplus for export." Apparently, this is to forestall other Canadian

manufacturers moving into blade coating.

Paper grades to be produced will be publication and catalog. This mill has a 146 and a 165 in. Fourdrinier with coating section and produces about 50,000 tons/year of book, writing and coated grades. The new off-machine coater will probably be about 150 in. wide.

BRIEFS

U.S. Gypsum reports Jacksonville start-up

JACKSONVILLE, FLA.—This new paper mill producing a range of paper grades for U.S. Gypsum Co.'s gypsum

board products is now in full production. The nine cylinder paperboard machines trims 156 in. and produces 150 tpd.

Major equipment is largely supplied by The Black-Clawson Co. The paperboard machine has a suction return drum press, four primary presses, plain first main press and a suction second main press.

The 150 ft. long Transite hood has a continuous aluminum plenum and a damper for adjusting exhaust pickup at any point in the hood. An unusual feature of the hood is a continuous walkway providing access to rope carrier supports.

The three stock preparation system delivers all the filler, back liner and

ZEOLEX IN PAPER

Reprinted from the new "Report on a Unique Pigment by the J. M. Huber Corporation Laboratories"

PROPERTIES IMPARTED BY VARIOUS PIGMENT COMBINATIONS IN BLEACHED SULPHITE HANDSHEETS

	75% SWW 25% TiO ₂ (Control)		75% SWW 12½% TiO ₂ 12½% Z-23		75% SWW 17½% TiO ₂ 7½% Z-23		75% Sp. Hyd. 12½% TiO ₂ 12½% Z-23		75% Hydratine 12½% TiO ₂ 12½% Z-23	
Pigment Loading Parts/100 of Pulp	4	14	4	14	4	14	4	14	4	14
PROPERTY										
Gurley Porosity, Secs./100 ml.	193	80	163	70	173	73	180	79	182	80
Gurley Softness, Secs./100 ml.	27	32	27	38	28	35	30	39	30	38
Gurley Smoothness, Secs./50 ml.	156	212	178	236	165	220	180	255	180	255
Mullen	42	27	41	26	41	26	40	26	39	25
Wax Pick (Dennison)	16	11½	16	11	16	11	15	10½	15	10

Costs were calculated as follows:

Clay—carload bulk prices per lb., F.O.B. Georgia.

SWW	0.60¢
Special Hydratex	1.10¢
Hydratine	1.50¢

Arbitrary freight rate of 0.75¢/lb. was added to each.

Zeolex was priced at delivered cost of 7¢/lb. TiO₂ was priced at delivered cost of 25¢/lb.

PIGMENT COMBINATION	PIGMENT COST/100 LBS.	
75% SWW	\$1.01	
25% TiO ₂	6.25	\$7.26
75% SWW	1.01	
17½% TiO ₂	4.38	
7½% Zeolex	.53	5.92
75% SWW	1.01	
12½% TiO ₂	3.13	
12½% Zeolex	.88	5.02
75% Special Hydratex	1.39	
12½% TiO ₂	3.13	
12½% Zeolex	.88	5.40
75% Hydratine	1.69	
12½% TiO ₂	3.13	
12½% Zeolex	.88	5.70

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Chemicals Division
Havre de Grace, Maryland

Data [presented elsewhere in brochure] demonstrate that use of Zeolex together with an appropriate clay makes possible a considerable reduction in the use of TiO₂, thus

substantially lowering the cost of pigmentation without sacrifice to sheet quality.

The foregoing tests were confined to the use of bleached sulphite pulp. However, the use of other chemical pulps or combinations of chemical pulps and ground wood yields more or less similar effects.

II. Tests on Handsheets composed principally of de-inked stock.

INGREDIENTS	FURNISH 1		FURNISH 2	
	With TiO ₂ & Clay	With TiO ₂ Zeolex & Clay	With TiO ₂ & Clay	With TiO ₂ Zeolex & Clay
De-inked Stocks	84.3 parts	84.3 parts	84.3 parts	84.3 parts
Virgin Pulp (chemical)	15.7 "	15.7 "	15.7 "	15.7 "
Clay, Huber SWW	2.2 "	2.2 "	12.9 "	12.9 "
TiO ₂ , Anatase	2.9 "	1.93 "	2.9 "	1.93 "
Zeolex	—	.97 "	—	.97 "
Rosin Size	1.0 "	1.0 "	1.0 "	1.0 "
Starch	1.0 "	1.0 "	1.0 "	1.0 "

Sufficient alum was introduced to adjust furnish pH to 4.5.

Handsheets were made in accordance with TAPPI standards.

A comparison of optical properties between titanium dioxide stocks and titanium dioxide-Zeolex stocks is shown in Table IV of brochure.

Here, again, in a distinctly different application, it appears possible to replace one third of the titanium dioxide with Zeolex without appreciable change to optical qualities.

Paper Division

J. M. Huber Corporation

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Please send me a copy of the new booklet, "Zeolex in Paper?"

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Company _____

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City _____ Zone _____ State _____

..... INDUSTRY GROWTH

top liner stock to the machine and consists primarily of two Hydrapulpers, Liquid Cyclones, jordan and thickeners, and Selectifiers.

Southern Pine Lumber Expands pulp-paper

DIBOLL, TEX.—Some \$1½ million is being spent on a two-phase expansion program here by the Fiber Products Division of Southern Pine Lumber Co. Completion is expected within 18 to 24 months, says Carrol Allen, vice president.

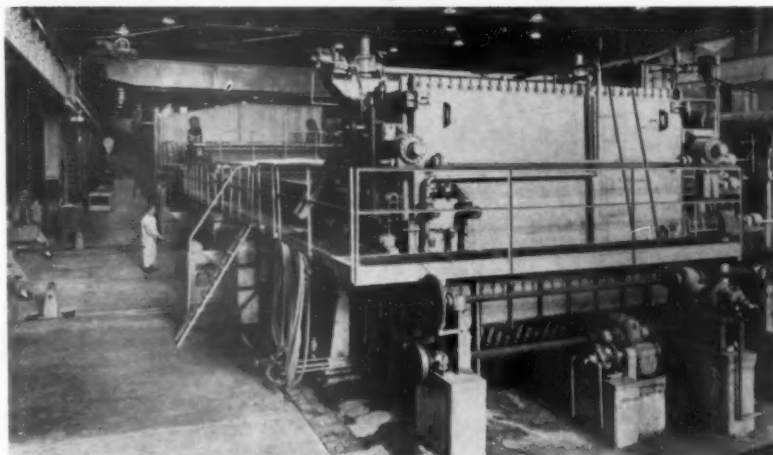
The program includes expansion of pulping capacity, new machine capacity and a new warehouse. Major objective of the project is to add machine capacity for a new line of decorated products and other specialties. This will be the fourth and fifth expansion programs the company has had since March, 1958.

Cellu-Products enlarges North Carolina plant

PATTERSON, N.C.—A plant addition of some 18,000 sq. ft. has been reported by Cellu-Products Co. The all-steel construction is a 150 per cent increase in the plant's overall manufacturing and production area.

According to company President Martin Doll, the new addition permits enlarging and streamlining of shipping operations.

New machine at Longview Fibre



THREE WEEKS after startup in August, this new corrugating medium and light-weight paper machine at Longview Fibre Co., Longview, Wash., was operating at rated capacity of 150 tpd. No. 9 machine, a 184 in. Beloit Fourdrinier, boosts mill's daily capacity to approximately 1,350 tons (See PULP & PAPER, Oct. 2, p. 15).

Alberta Newsprint Mill Expects Action Soon

VANCOUVER — Alberta West Forest Products Corp., Ltd., expects to announce plans soon to finance and construct its proposed newsprint mill in the Whitecourt area of Alberta, which is about 100 miles northwest of Edmonton.

Operating name of the company will be Alberta West Newsprint Mills, Ltd., according to Gordon D. McNab. He says construction of access roads to pulpwood stands, and of some units of the mill itself, will be started before the year end. Production is expected to start 22 months after start of construction. It will be the first newsprint mill in Alberta.

..... BUSINESS

Corporate profits up in second quarter

WASHINGTON, D.C.—Momentum and confidence dominate almost every aspect of the business community as it heads into the fourth quarter, reports Secretary of Commerce Luther H. Hodges. Gross national product, which was running at an annual rate of \$501 billion in the first quarter of this year, went to \$516 billion in the next three months, moved at the rate of \$526 billion in the third quarter. From October to December, it is expected to be at an annual rate of \$540 billion, says Secretary Hodges.

A quick rundown shows that corporate profits rose \$5½ billion in the second quarter to \$45½ billion annual rate. With better earnings, business spending for new plant and equipment is also on the way up and

as PULP & PAPER has previously reported, the pulp and paper industry has shown signs of stepping up its modernization and expansion pace.

The latest forecast is that capital spending for all U. S. industry will climb from an annual rate of \$34.8 billion in the third quarter to \$35.9 billion in the fourth. This will mean, says Mr. Hodges, outlays 7% greater than those in the second-quarter trough. And this spending will mean more business for papermakers.

Consumer retailing spending still lags, as pointed out by PULP & PAPER, Sept. 18, but retailers expect the momentum to pick up by mid-October.

Record earnings are reported by some paper companies. Examples: Whippany Paper Board Co. says its

net earnings for year ending June 30 rose to a record high of \$1,967,773 or 81¢ per share, a 10% increase for fiscal 1960. Increase was achieved despite drop in sales from a high in 1960 of \$49,502,001 to \$44,983,257 for fiscal 1961.

Another example: Diamond National Corp. says its third quarter earnings were highest in its 81 years. William H. Walters, chairman and president, reports earnings for the 12 weeks ended Sept. 10 rose to a record \$3,333,000, 14% above the same period last year. Net sales increased to \$55,309,000, 3% above 1960. Earnings amounted to 71¢/share. Looking ahead, Mr. Walters says earnings for 1961 would top last year's when net income was \$12,706,000 or \$2.69 a share.

Professor Pulp takes time out...



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rely on these quality pulps:

SEAGULL
Bleached Soda Pulp

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Bleached Sulphite

DONNACONA
Unbleached Sulphite

WINDSOR
Unbleached Kraft



Newsprint capacity will top demand

VANCOUVER—Although newsprint consumption in the western region of North America will rise sharply during the next four or five years, capacity will grow at an even faster rate, according to a survey just completed by Powell River-Alberni Sales, Ltd., the sales subsidiary of MacMillan Bloedel & Powell River, Ltd.

It has been four years since the company reported on the position of newsprint supply and demand in the western region, which includes the 13 western states, Hawaii, B.C. and Alberta.

In June 1957, at a high point in the business cycle, a publisher survey of future newsprint demand was

made. In 1958 the U.S. passed through one recession and it is now coming out of another one, Ralph M. Shaw, board chairman, points out.

Mr. Shaw reports that the western region demand of 1,384,000 tons that was forecast for 1960 in 1957 is now believed to have been 100,000 tons too high. The available supply for 1960 that was estimated in 1957 turned out to be 50,000 tons too low, he says.

"This means that instead of a 33,000 ton surplus, which was forecast, actual unused capacity amounted to 186,000 tons for 1960—productive capacity of one and one half modern newsprint machines," according to

Mr. Shaw. "From 1961 to 1965, it is expected that the upward movement of newsprint consumption in the western region will continue except for a slowdown in 1961. However, regional capacity will grow at an even faster rate during these years. Using only present capacities of producers and capacities of new mills or additions actually under construction, surplus capacity is expected to increase from 185,000 tons in 1960 to 270,000 tons in 1965. Should Crown Zellerbach bring into production its announced mill at Kremmling, Colo., during this period, the surplus in 1965 will increase to 370,000 tons, double the surplus in 1960." ■

Independent merchants sell biggest share

WISCONSIN RAPIDS, WIS.—Recent mill-merchant mergers have actually strengthened remaining independent merchants, says Harold Murtfeldt, vice president, enamel paper sales for Consolidated Water Power & Paper Co. Alluding to the recent merchant-mill mergers, he says Consolidated believes every present independent merchant has a free choice and can continue to prosper as an independent if he chooses to do so. "In spite of the seemingly long list of mill-merchant mergers," he states, "only 140 merchant houses are owned by mills and handle approximately 13% of total

merchant business."

Mr. Murtfeldt also predicts that coated paper will have the highest growth of any segment of the printing paper industry. "Within the next 15 years some group of paper merchants is going to sell 500,000 tons more of coated paper than it did in 1950. On a straight line projection, 5% a year is forecast by many. Today 46% of the printing paper industry is coated paper, whereas only 12% of the total was coated when Consolidated pioneered its coating process in 1935," he said.

Printing paper sales by merchants

for the first eight months of 1961 were up about one-half per cent. August sales were up 17% over July to reach an index of 169.31 (base year is 1954). Industrial paper merchants reached a new high index of 167.59 and while sales are 0.10% below the 1960 level, lower costs of paper indicates tonnage has actually increased, according to the National Paper Trade Assn.

Wholesale paper merchants sold more than \$1,669,175,000 of industrial papers last year and about \$1,472,829,000 of printing papers, according to NPTA. ■

... INTERNATIONAL

Canada's pulp-paper backs UK entry into EEC

MONTREAL—Canada's biggest industry, pulp and paper, is opposing its government's effort to dissuade the United Kingdom from joining the European Common Market.

Industry spokesmen contend that, while there may be some short-term losses resulting from Britain's membership in the Common Market, it is short-sighted and unrealistic to protest the apparently inevitable move. Continuing opposition to Prime Minister MacMillan's aim and policy could spell trouble, they say.

Canadian pulp and paper men take a dim view of the campaign by federal government ministers in Accra and elsewhere against Britain's objective. Because of the industry's

importance, it's attitude may well influence Ottawa to modify the position taken by Prime Minister Diefenbaker and his aides.

What the industry hopes for is not restriction but broadening of trade, continuance of free trade with Britain and an extension of the free trade principle among other countries. To that end, the CPPA has submitted a statement to the Canadian government reviewing some of the issues at stake.

Reaction of the industry in Canada to Britain's bid was first reported in the Aug. 21 PULP & PAPER.

The Canadian industry, which sells about \$100,000,000 worth of pulp and

paper to the United Kingdom annually, wants to maintain this trade and also to increase trade in these commodities with the expanding European market. Trade between Canada and the six EEC countries was valued at only \$15,000,000 in 1960.

"Canada's trade in pulp and paper is substantial and growing with the U.K., but apart from pulps it is only marginal with Western Europe," according to a CPPA statement. "However, the growth of demand for pulp and paper in the Common Market has been phenomenal. Potential changes in European distribution methods could result in growth of demand for pulp and paper that will be much greater than might be expected from

Stock proportioning goes automatic

System improves product quality,
cuts costs at Combined Locks Paper Co.

Automatic control has stabilized product quality and brightened the profit picture at Combined Locks Paper Company, Combined Locks, Wisconsin. The mill recently replaced manual controls for batch stock preparation with a system designed entirely by Honeywell, from level detector to valves. The system will pay for itself many times over in short order.

The Honeywell control system was designed to automate five existing mixing chests which were previously manually operated. Honeywell controls measure the level of stock in five mixers. Proportioning and sequencing for each blending system are completely automatic. The desired furnish can be reproduced identically from batch to batch by setting a repeat switch. Stock proportioning is varied

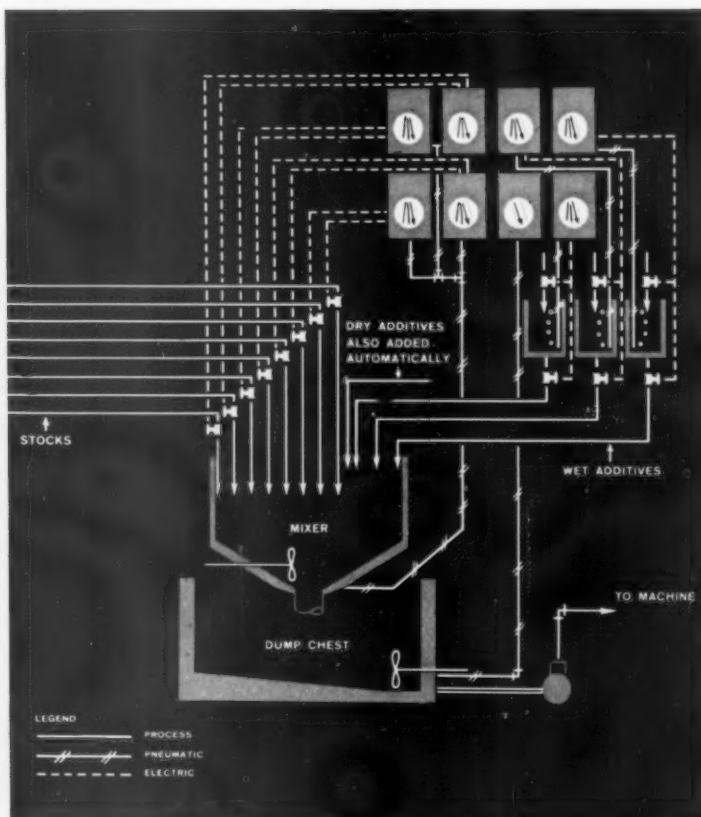
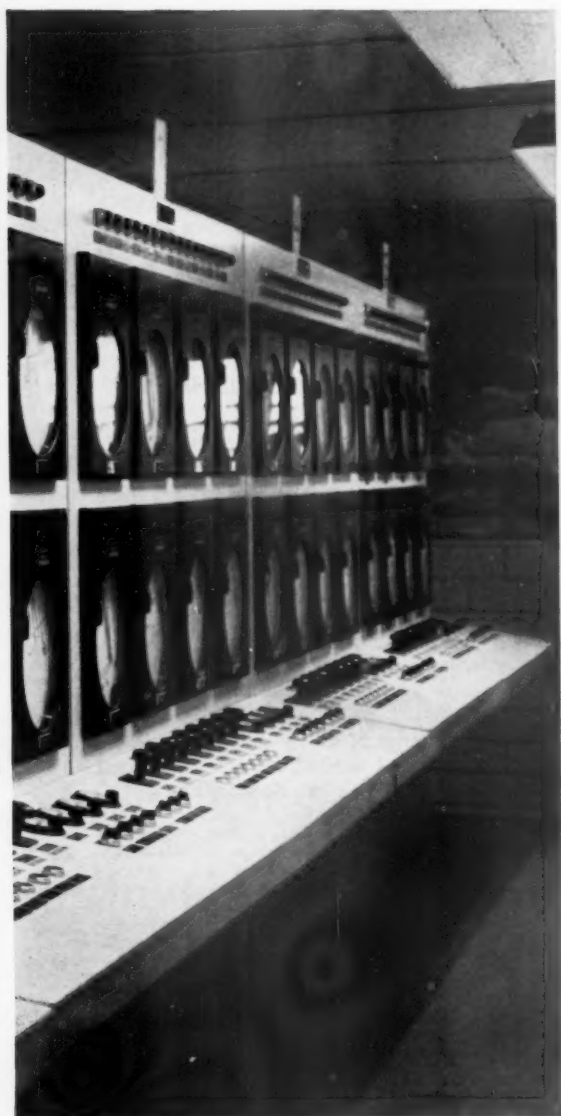
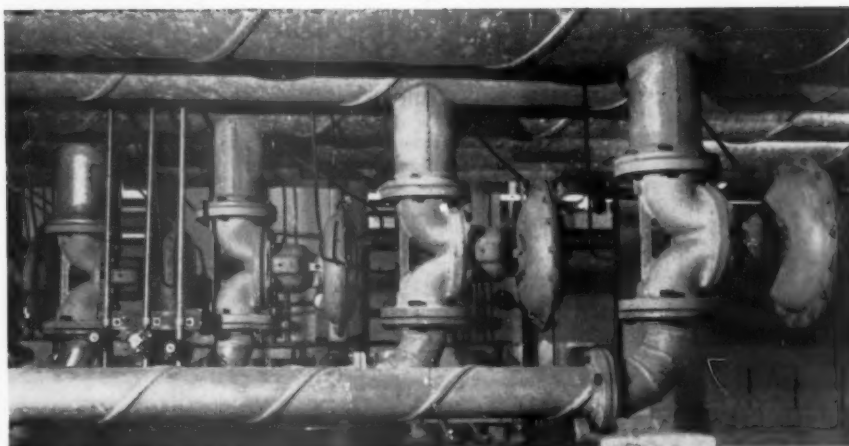
simply by changing the control index of instruments on the panel. Because this automatic control is far more accurate than manual methods, product quality is uniformly high. Where operators previously had to stand by during the entire process, pushbutton simplicity now saves time, money, and tedious repetitive labor.

To automate a process in your mill, specify the results you want, and let Honeywell do the rest—everything from initial planning, through installation and startup, to maintenance. Call your nearby Honeywell field engineer—he's as near as your phone. MINNEAPOLIS-HONEYWELL, Wayne and Windrim Avenues, Philadelphia 44, Pa.—In Canada, Honeywell Controls, Ltd., Toronto 17, Ontario.



with Honeywell control system

Honeywell Saunders Control Valves regulate input stocks to five batch stock proportioning systems. (Use of repeat cycle provides continuous supply to machine.) The self-cleaning action of these valves makes them ideal for stock blending. Each of the five systems uses eight stock valves and six wet additive valves.

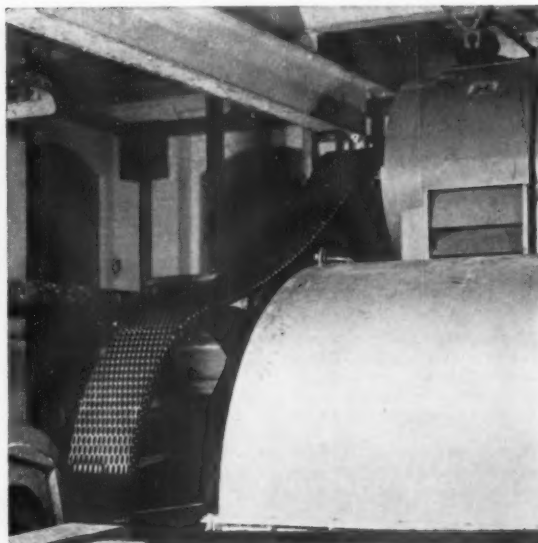


Honeywell instruments measure level of stock in five beaters and mixers. Sequence of stock additives can be changed from batch to batch or be reproduced exactly.

Honeywell
First in Control
SINCE 1885

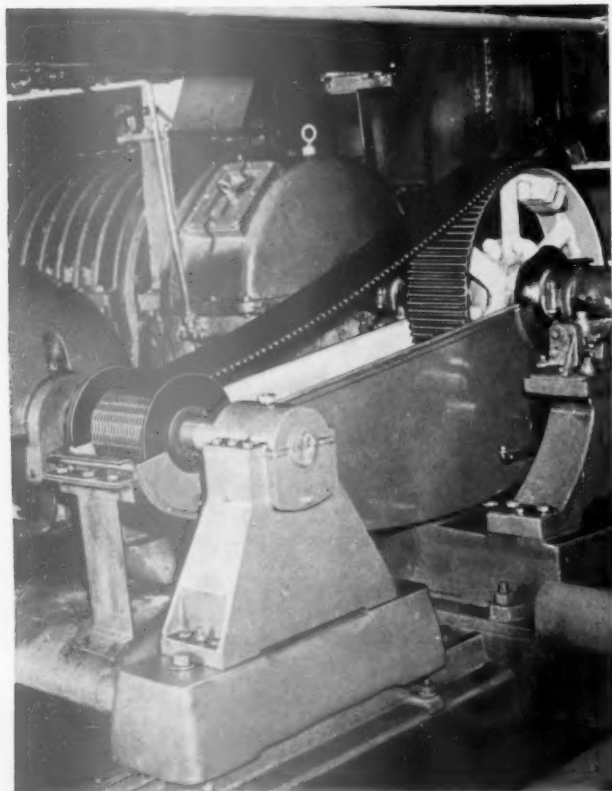
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Link-Belt silent chain

for drives that can't afford to slip



Smooth, positive engagement assures full power transmission

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Link-Belt silent chain assures efficiency for either large or fractional-horsepower drives. Easy assembly in tight spaces permits built-in drives, compact housings. Close grouping of equipment saves valuable floor space. High humidity, temperature have no effect on performance. Ratios as high as 10-to-1 are accommodated on relatively short centers.

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the usual production techniques. . . . Moreover, there is much evidence to suggest that European fiber resources are, and increasingly will be, inadequate to supply European demand. It is clear even now that a substantial and growing demand for North American pulp and paper is likely to exist in Western Europe unless it is artificially restricted by tariffs and quotas.

"We believe a British tariff and quota system for imported Canadian newsprint, pulp and paperboard would be completely unsatisfactory and would seriously damage existing trade in these commodities between Canada and the U.K. This trade is now growing and second only to wheat in annual value. It is not only a question of preserving this important volume of Canadian trade

and maintaining the national revenue and employment it produces, but also a question of participating in the anticipated growth in demand for pulp and paper products both in the U.K. and in the rapidly growing economies of Western Europe.

. . . the primary objective of Canadian policy should be to obtain duty-free entry of pulp and paper products into the Common Market.

"Canada should recognize the realities of Britain's trading difficulties not only in the interests of being able to argue effectively for special arrangements to preserve existing Canadian trade but also because Canada has a vital interest in Britain's being economically strong and Europe's being politically strong."

(A similar view was expressed by J. D. Zellerbach, chairman of the

board Crown Zellerbach Corp. in an address to the Vancouver Board of Trade September 19. See "Business.")

At present, Canadian newsprint, pulp and paperboard enter the U.K. free of tariffs and quota restrictions. In that market, Scandinavian newsprint and pulps also are free of duty, and paperboard has carried a duty of 14 to 20%, which is being progressively eliminated under EFTA.

"The developing danger in the Western world is its fragmentation into regional trading blocs," the association asserts in its statements. "Since such groups are forming, the only hope is that certain commodities can move freely between the regional groups. It is difficult to think of more appropriate things than pulp and paper commodities to provide the essential cement between the blocs." ■

Scott will form Japanese affiliate

PHILADELPHIA—Scott Paper Co. will form an affiliate in Japan, together with a Japanese firm, to make and sell sanitary paper products. It will be Scott's ninth foreign company.

Common stock of the new company, to be called Sanyo-Scott Co., Ltd., will be owned half by Scott and half by Sanyo Pulp Co., Ltd., a major

Japanese pulp and paper manufacturer. Sanyo-Scott will be capitalized at \$3 million.

The company expects to start construction shortly of a new mill just outside Tokyo. Japanese will fill "virtually all production and administrative jobs" in the firm, while Scott will furnish technical advisers, en-

gineers and marketing personnel, according to Scott.

Products made by the affiliate will be marketed under Scott trademarks.

Sanyo Pulp is Japan's leading producer of dissolving pulp, having an annual capacity of 170,000 tons. Pulp used in paper making is produced at the rate of 75,000 tons a year. ■

Canada sees rise in pulp exports to Japan

VANCOUVER—Canadian pulp exporters hope to resume trade with Japan on a large scale next year in anticipation of relaxation of import restrictions.

Last year of substantial exports to Japan was 1957, when they totalled 200,000 tons. Some 78,000 tons consisted of paper pulp. Restrictions were imposed in 1958, when total shipments declined to 100,000 tons, of which about half was rayon pulp.

Japan's purchases dropped to 80,000 tons in 1959, and they have been relatively light this year.

The Japanese government has imposed tariffs to encourage the country to live within its own resources. Domestic pulp supplies come principally from Sarawak Sakhalin. However, its cost has risen to the point where the government is contemplating upping its Canadian and U.S.

purchases. This would also improve quality of domestic pulp and to stabilize prices charged to consumers.

If more pulp is demanded from Canada, however, exporters in British Columbia will face the problem of the rising costs of deep sea charters. Storage of tonnage has been intensified by the movement of Canadian wheat to China as part of a long term, \$60,-000,000 contract. ■

..... MEETINGS

Inverform steals show at Northwest PIMA

ROCKFORD, ILL.—A new model of the revolutionary Inverform paper and paperboard machine, with two top wires (picture), was shown for the first time at the recent annual meeting of the Northwestern Division of PIMA here.

Many of the more than 300 dele-

gates in attendance studied the replica of the British invention, which demonstrated operations such as wire-changing.

A 168-in. wide Inverform machine with five top wires will be housed in a mill being built by Federal Paperboard Co. at Versailles, Conn. The

machine is scheduled to be started up by next August. It will make folding boxboard at speeds up to 1,000 fpm.

The primary headbox and four identical secondary headboxes will be conventional in design. William Wyburn, vice president-engineering, is directing the project for Federal.

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*Registered trade name of The International Nickel Company.

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150-pound Stainless Steel "Y" Valve. Outside screw rising stem and yoke. Bolted flanged bonnet. Integral seat. Available only with flanged ends. Fig. 1944 in sizes 4" through 8". End flange and face to face dimensions conform to MSS SP-42 Standard.

150-pound Stainless Steel O.S. & Y. Gate Valve Fig. 2453DG, with split wedge, in sizes 2 1/4" through 8". Also available as Fig. 2453SG with interchangeable solid wedge in sizes 2 1/4" through 18". Two designs: one-piece yoke, 2 1/4" through 4" and separable yoke arms, 5" through 18".

200-pound W.O.G. Swing Check Valve, Fig. 2192. Body and bolted cap are Ni-resist. Valves through 8" have renewable Type 316 stainless steel seal ring, disc and disc holder; discs in 10" and 12" valves are Ni-resist with Type 316 stainless steel facing. Sizes, 2" through 12".

115th year of manufacturing industrial valves for the free world

POWELL PAPER MILL VALVES

THE WM. POWELL COMPANY CINCINNATI 22, OHIO

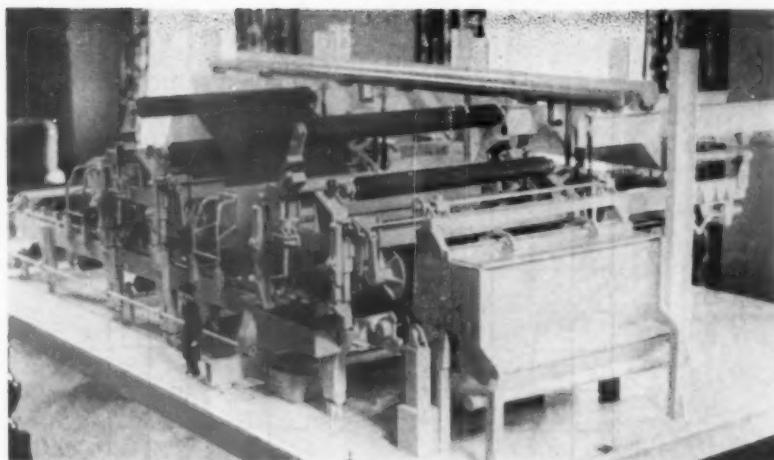


It will be the second installation of the Inverform in North America, the first being at the National Gypsum mill in Newburgh, N.Y., where it is making #45 two-ply lathe board. This machine with two top wires is 100 in. wide, and operates at 270 fpm. It has 81 dryers. The board can be run to a coater in the basement, which puts on a base coat with a metering bar and a top coat with an air knife. It has one high velocity and two low velocity Aircap dryers and a gloss calender.

The equipment for these two mills was made by Beloit Iron Works.

The Inverform, which provides a means of applying pressure to a turbulent mass of pulp and water during a short interval of time as the pulp suspension enters the ingoing top wire nip, was invented in 1956 at St. Anne's Board Mill, Ltd., Bristol, England. St. Anne's is making folding boxboard on a 114-in. trim commercial Inverform machine with four top wires, at speeds up to 1,200 fpm. St. Anne's also has an experimental single top wire machine operating at speeds up to 3,400 fpm and with design speed of 5,000 fpm.

The only other machine in the world recently was put into operation at Australian Paper Manufacturers,



MODEL OF INVERFORM paper machine has two top wires. It was an important attraction at PIMA meeting.

Ltd., Petrie, Australia. It is 156 in. wide, with 136 in. trim. It is making up to five-ply board and two or three ply bag and corrugated.

Host for the PIMA meeting in Rockford was Beloit Iron Works, which opened its doors to plant tours on Sept. 20, before the PIMA meetings began. Over 150 mill men and equipment and other suppliers saw papermaking and coating machines for several mills in various stages of construction. The tours were conducted as scheduled, even though they fell on same day as the funeral for the late Elbert H. Neese, Beloit chairman.

Phillip W. Budd, The Northwest Paper Co., was elected new chairman of the PIMA Northwestern Division, succeeding Arthur A. Bernhardt, of Nekoosa-Edwards. Lawrence A. Pflieger of Marathon, Rothschild, Wis., was elected first vice chairman; and James R. Wright, Green Bay Paper and Pulp Co., second vice chairman.

Thomas M. Jones, of Beloit, was ar-

rangements chairman, and Mr. Budd was program chairman. Hubert MacDonald of Draper Bros. and Ralph Buechler of D. J. Murray were leaders in affiliate activities in connection with the meeting. Ives Gehring, new president of PIMA, keynoted the program.

The hardwoods-cold soda pulp mill at Waldorf Paper Products Co. at St. Paul was described by Richard Johnson, pulp mill supt. The mill has two-stage refining of chips with Bauer H-11 units. The pulp is bleached for foodboard.

Speakers were Dr. Edward F. Thode, Institute of Paper Chemistry; Richard Martinek, in charge of all coating and book paper production by Kimberly-Clark; Fred Sundstrom, American Cyanamid; C. R. Recor, Beloit; Harold Huseby, Northwest Paper Co.; William Haselow, Consolidated Water Power & Paper Co.; Harry Hehner and Dan Folsom, Monsanto; Philip Kuehn, Wisconsin Cold Storage Co.; and Eugene Abegg, Illinois National Bank. ■



PHILLIP W. BUDD, The Northwest Paper Co., is newly elected chairman of Northwest Division, PIMA.

... RESEARCH AND DEVELOPMENT

Japanese processes yield wood chemicals

SEATTLE, WASH.—Considerable effort is being directed toward complete utilization of wood and derived products in Japan, particularly wood chemicals. Dr. Notoyoshi Oshima, managing director of Noguchi Institute, of Tokyo, Japan, discussed some phases of this work at recent Institute of Forest

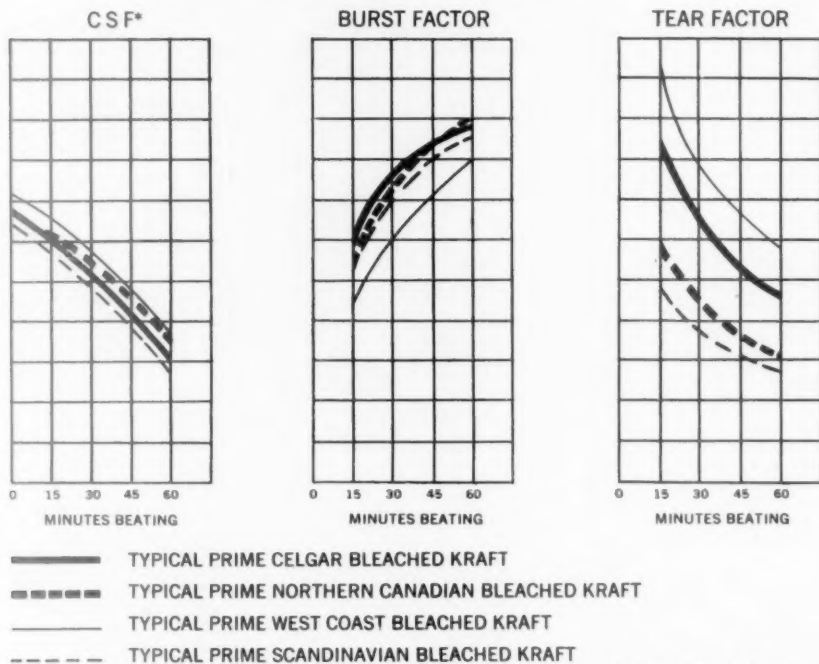
Products seminar, U. of Wash. here.

Dr. Oshima reports an improved technique has been developed at Noguchi Institute for making commercial wood sugar production "economically more feasible." This process involves reducing wood to "sawdust size" particles and impregnating it

with 20% hydrochloric acid at a temperature too low for maintaining hydrolysis. It is then treated with cold hydrogen chloride, transferred to a fluidization tower where hot hydrogen chloride is introduced and complete hydrolysis takes place. Most of the gaseous hydrogen chloride is removed

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STRENGTH VALUES



As shown by the above graphs, Celgar Kraft compares favourably with the world's best prime bleached kraft pulps in standard pulp tests.

In the all-important beating time to required papermaking freeness, it develops faster than other typical Canadian bleached kraft pulps, comparing favourably with the fast-beating Scandinavian furnish. This feature means high-volume output from repulping equipment at reduced power cost.

The bursting resistance of prime bleached Celgar Kraft exceeds or compares favourably with the best of its competitors while it is excelled only by West Coast bleached krafts in tearing resistance.

This unique and outstanding balance of properties at a high level can be achieved because of the Interior grown tree species used, the climatic conditions under which they grow and the modern process equipment installed in the new Celgar mill. These pulping characteristics, coupled with low beating time and good printability, place Celgar Kraft among the best bleached kraft pulps available in the world.

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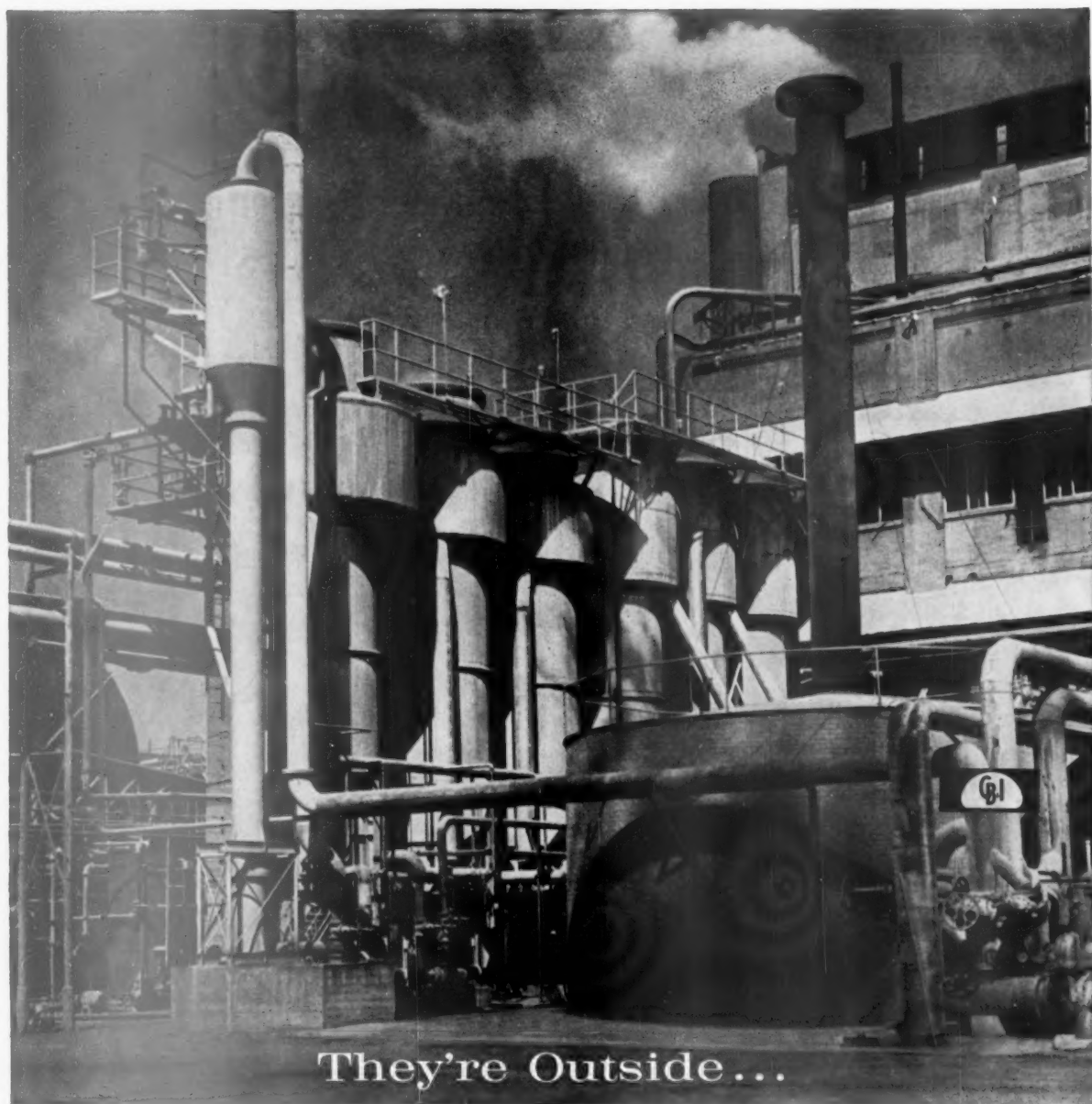
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Installation of CB&I's sextuple effect evaporator at International Paper Company's Georgetown, South Carolina, mill resulted in the following performance:

More than 99.9% of the chemicals processed by this evaporator are recovered. Equally important are the operating economies of this highly-efficient evaporator system. Waste heat is collected at a low cost. The CB&I patented integral pre-

heaters reduce steam requirements and improve the evaporation capacity. The patented entrainment separators for recovering process chemicals are most efficient.

Constructed with stainless steel and Hortonclad® stainless in areas subject to corrosion, and embodying CB&I's high standards of fabrication, this evaporator will operate efficiently for years with minimum maintenance costs.

This evaporator is one of many ways CB&I works with the pulp and paper industry in improving efficiency and increasing production. Chicago Bridge & Iron Company, 332 South Michigan Ave., Chicago 4, Illinois. Offices and subsidiaries throughout the world.

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... RESEARCH AND DEVELOPMENT

to a separate tower for recycling. The resultant product (lignin, sugars) is treated with hot water for removal of sugars, in aqueous solution, which are used for producing dextrose.

Hemicellulose fractions are concentrated for production of furfural by a high-yield process which avoids polymerization. In this process hemicelluloses, together with hydrochloric acid, are blown against a 200°C. surface. During the short contact time, reaction takes place and most of the hydrogen chloride evaporates. This operation produces furfural yields up to 90%.

Three approaches are currently being investigated at Noguchi Institute for producing simple chemicals from lignin—oxidation, chlorination and hydrogenation. The simple oxidation

product, vanillin, is easily derived but does not lend itself to further use as a basic chemical. Polymeric materials derived from the vanillin have too low a melting point; removal of the methoxy group after oxidation is difficult.

Oxidation following the initial chlorination of lignin yields benzaldehyde up to 40% and opens a way for using polymers. Industrial production is, as yet, not feasible.

Hydrogenation of lignin appears to be most promising of the three approaches. Such processing, carried out in the presence of catalysts, leads to "liquefied lignin oils" from which several basic chemical compounds can be derived. Major difficulties are still involved in controlling yields of the individual phenolic



DR. OSHIMA reports developments at Seattle seminar.

fractions, due principally to the non-uniformity of the lignin used. Dr. Oshima says future markets may see an ample supply of chemicals derived from wood and its products. ■

... PULPWOOD MANAGEMENT

Land use conference makes a 'good start'

Diverse group discuss problems in friendly atmosphere

WASHINGTON, D.C.—The problem of future land use may seem remote and not of pressing concern to a papermaker, but if the paper industry is to meet future demands for its products from a growing U.S. population that is expected to reach at least 300 million by the year 2000, it must have an adequate wood supply, emphasized speakers at the Land Use Conference of American Forest Products Industries, Inc., held here last month.

At least one million acres of valuable prime timberland and crop land are nibbled away each year by urban expansion, highway and airport construction, development of flood control systems and national defense areas. This means that the industry will have to supply the future needs of this growing population from a land area that is diminishing (PULP & PAPER, Oct. 2, p. 59).

Solutions to this problem were explored by the 300 delegates to the Land Use Conference, representing many different groups brought together at one conference table for the first time.

"The meeting," says one delegate, "was a high point in a cooperative approach to determine land use in the future. It was exploratory and it did a good job. My impression is that we have made a good first step. But it

will take much cooperation by each side to face up to the problem of future land use."

There are an estimated 784 million acres of forest land in the U.S.—about one-third of the nation's land area. "There is a conflict," says Dean George A. Garratt, Yale School of Forestry, who was conference keynote speaker, "over management of forest lands for diverse values. Multiple use involves consideration of all major benefits inherent in the forest, timber, water, forage, wildlife and recreation, with each area so managed to combine the best advantages."

Considerable concern is felt in the paper industry over the fact that some groups are pressing aggressively to lock up more and more of the nation's timber lands as wildlife preserves. These lands would be confined to a single use, and withdrawn forever from harvesting activity. The U.S. Forest Service's Chief Forester, Richard E. McArdle, sounded an encouraging note when he said that "formal designation of very large areas of national forests for wilderness-type preservation is not likely—and will remain stable."

Dr. McArdle asserted: "The public favors preservation of wildlife conditions but they also want accessi-

bility. We (the Forest Service) are moving aggressively to catch up with our recreation land and we intend to move still more aggressively in this direction."

Probably the single most important development of the meeting was that the various groups did not seek to exploit the situation to "take pot shots" at the other side, as might have been expected.

One paper industry executive told PULP & PAPER, that the meeting was an important step for the industry.

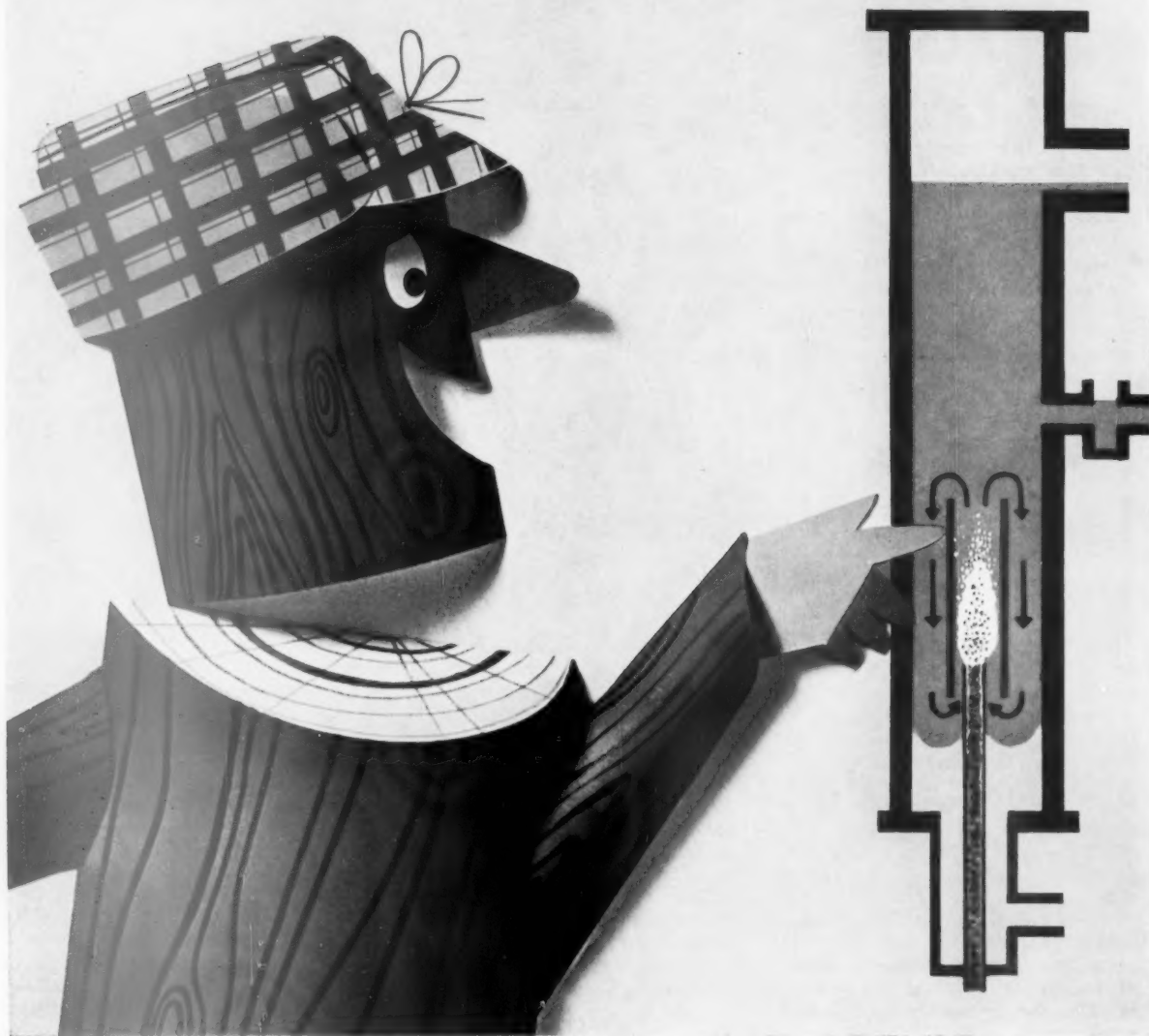
"It was a tremendous start for future work by the industry," he contended. "But don't get the impression that everybody loves us and that the conservation fellows are ready to say that we are right."

"These people who attended, in a sense were hand-picked, there were no wild-eyed people, but they were representative of a broad segment of the people we want to reach."

"This is not the end of the problem. It's just the beginning. We have to have more conferences and meetings and get down to the local level and talk to the government and the people."

"Another indication of the tone of the meeting is that the discussions were reasonable and friendly. The industry came out of the meeting in fine shape." ■

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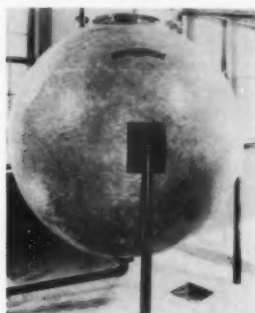
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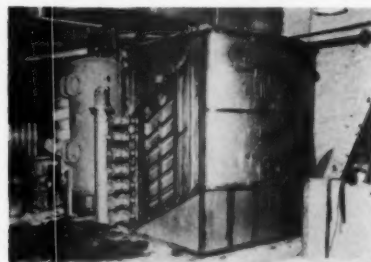


Applications: For storing materials requiring high chemical resistance.

Advantages: Glass-reinforced spherical tank is approximately $\frac{1}{4}$ the weight of a comparable stainless steel unit, the company says. Tank is fabricated by winding continuous fibers impregnated with polyester resin on a spherical surface. Spherical shape provides minimum surface area per unit of volume and minimum stress concentrations. Shape of the "Chemisphere" also permits easy cleaning and draining. The tank currently is manufactured in 6 ft. and 8 ft. diameters, with 847 gal. and 2,009 gal. capacities, respectively.

Supplier: Justin Enterprises, Inc., 3755 Edwards Rd., Cincinnati, Ohio.

Flotation savealls ... for small areas



Applications: Produces clarified effluent from reclaimed stock.

Advantages: Stainless steel units come in eight capacities, ranging from 200 to 2,400 gpm., for both inside and outside installation. The company says that the small size of its Krofta "superfloat" unit allows placing it near paper machine, eliminating long pipe lines. The company further says that stock is reclaimed at up to 2% consistency and effluent clarified with not more than 0.5 lb. filterable solids per 1000 gals. The unit has no moving parts and requires only a level floor foundation. Savealls meet Federal, state and local stream require-

ments, the company says.
Supplier: James Hunter Machine Co., North Adams, Mass.

Equipment cabinets ... for remote installation



Applications: For all equipment and controls outside production area.

Advantages: Separate functional panels within the cabinets are mounted on cast frames which swing out for access. The unit's remote location saves production floor space. Other design features are gasketed construction, combination push button lamps to save space and stainless steel panels.

Supplier: Industrial Nucleonics Corp., 650 Ackerman Rd., Columbus 2, Ohio.

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Applications: Castable suitable for lining stacks, boiler furnaces, etc.

Advantages: Reportedly produces high-strength monolithic body with high-abrasion and shock resistance. Recommended use temperature is 2500 F. Unit can be either dry or wet gunned.

Supplier: The Babcock & Wilcox Co., 161 East 42nd St., New York 17, N.Y.

Motion recorder ... detects screen movements



Applications: Transmits Fourdrinier wire stretch roll motion to recorder.

Advantages: The company says the unit is designed to operate under very wet conditions, and that a Canadian mill installation has operated trouble-free over two years. Any verticle movement of the roll will change position of detector arm on unit, and a corresponding signal is sent to recorder.

Supplier: Fisher Governor Co., Marshalltown, Iowa.

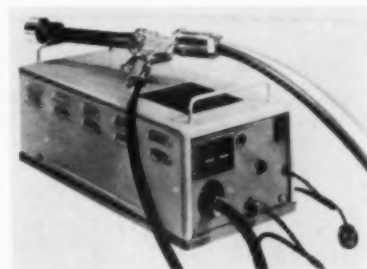
Cellulosic insulation ... strengthens paper

Applications: For improving paper tensile and bursting properties.

Advantages: Introduction of the insulation does not materially increase the cost of the finished product, the company says. Stabilization of the cellulosic product is accomplished by adding chemicals, thus increasing oxidation resistance.

Supplier: Westinghouse Electric Corp., Box 2099, Pittsburgh 30, Pa.

Spray gun ... for coating paper

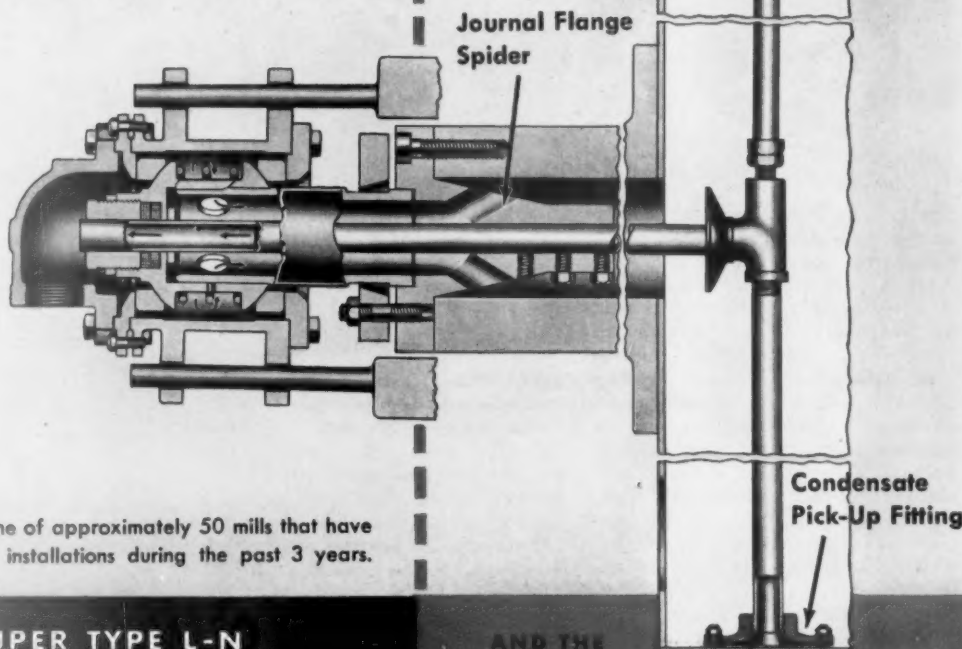


Applications: Coats various shapes with plastic or enamel powders.

Advantages: The company says its portable electrostatic hand spray gun gives an evenly . . . turn to p. 92

You've never seen a Combination like this*...

for Paper Machine Dryers



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Unless yours is one of approximately 50 mills that have made tests and installations during the past 3 years.

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JOHNSON JOINT with "Quick Release" Nipple

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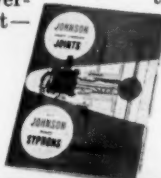
Best Design Yet for getting steam into dryer rolls with rotating syphon pipes. Needs no lubrication or adjustment. Has only a few simple parts—less chance of trouble plus easier field servicing. Assembly plate provides ready access to syphon pipe.

Floating Action—Rod supports carry all the real weight, let the rotating assembly "float" freely inside. Adaptable for machines with open or enclosed gearing.

SUPER Construction...and Stamina—Teams rock hard "Green Streak" seal rings with special Ni-Chrome plating, slashes friction load and increases service life.

Easy on...and off—"Quick Release" nipple uses powerful wedging action to lock joint in place. Install it—or remove it—with just an end wrench.

Engineers' Data Book summarizes research behind this new development, has full technical information. Ask for copy of: "Condensate Behavior in Paper Machines."



Better Drainage of dryer rolls results from a new concept of condensate pick-up design. Holds condensate to a minimum. Rotary Syphon can be located any place along the dryer shell. Helps to reduce horsepower requirements.

Higher Roll Temperatures—Thinner condensate film means better transfer of heat units to dryer shell. Better drying can be translated directly into increased production.

Easier Installation—No need to get inside dryer to drill and tap dryer head. Install right through manhole. For rolls with handholes only there's even a journal-inserted rotary syphon.

Reduced Maintenance—Only a few simple trouble-free parts. Ends bearing wear caused by unnecessary water weight and prolonged "cascading." Easily removed for inspection.

Trial offer still goes. We'll gladly furnish a pair of Joints and Syphons for 90-day trial in your own mill, without cost or obligation. Ask for details.



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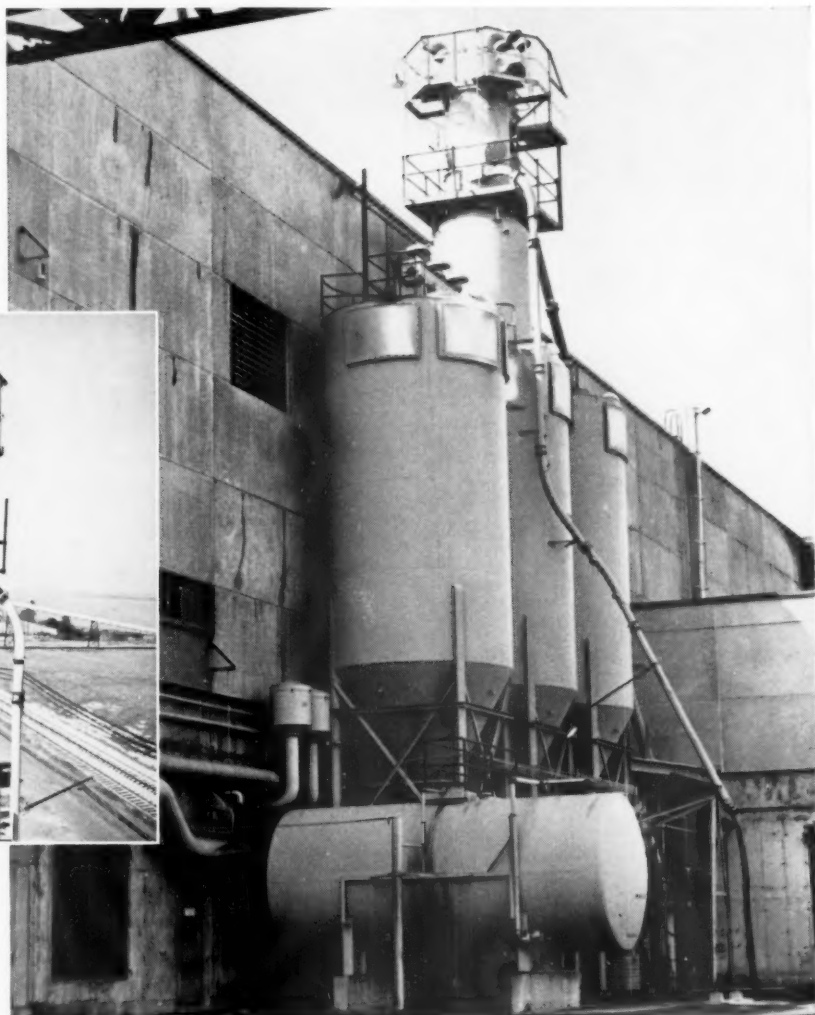


CYANAMID

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Overall view shows conveying line running in front of storage tanks to Airveyor filter at top.



Pneumatic Conveying System Handles Both Corn And Potato Starch At Crown Zellerbach Plant

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Starch shipments arrive at the plant by rail. A Fuller dual-feed unloader is quickly positioned to transfer the starch through the 6 inch diameter system a distance of 100 feet to storage at a maximum rate of 14 tons per hour.

Delivery is to three tank silos—one for potato starch—through a Fuller Airveyor Filter.

While the system was planned for corn starch handling only, its ability to handle potato starch as easily has proved a bonus value. Original planning also provided for a system capable of handling future plant expansion requirements without alteration or expansion of the Airveyor system.

If your plant is currently handling fine dry materials in bags, check with Fuller. Our engineers may be able to recommend an appropriate system that will offer results similar to those gained by Crown Zellerbach.

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NY&P makes three changes at Lock Haven

LOCK HAVEN, PA.—Garrett C. Mitchell has replaced Hubert F. Parker who has retired as division engineer for the New York & Pennsylvania Co., Inc. here.

Samuel A. Wood has filled Mr. Mitchell's former position of division maintenance superintendent, and Allen B. Campbell now is electrical maintenance foreman. Since joining the company in 1958, both men had been serving as assistants to Mr. Mitchell.

Mr. Mitchell, joined NY&P in 1948, after he received an electrical engineering degree from the University of Pennsylvania. He is a member of



MITCHELL



WOOD



CAMPBELL



PARKER

TAPPI and AIEE.

Mr. Parker, who retired July 31, joined the company in 1925. He was in the maintenance division for 21 years and in corporate engineering for

the past 13 years. Mr. Parker is chairman of TAPPI mill maintenance and engineering division and a member of the American Institute of Plant Engineers.

STRICTLY PERSONAL...

South

Carl H. Shepherd Jr. has been appointed production mgr., fiber products division, Southern Pine Lumber Co., Diboll, Tex. He had been division supt. since January 1959.



Robert W. Shaw has joined technical services, industrial products dept., J. M. Huber Corp., Huber, Ga. Mr. Shaw will assist mills in uses of clays, carbon blacks and pigments.

Harold R. Hickson, senior chemical engineer and R. Lawrence Scoville, research chemist, Continental Can Co., have moved from Uncasville, Conn. to Augusta, Ga. . . . Joe H. Armistead has been appointed asst. paper mill supt., and B. S. Ogden has been named tour foreman, Halifax Paper Co., Inc., Roanoke Rapids, N.C.

George H. Belin was named regional mgr., new Dallas office, fine paper division, International Paper Co. James D. McKoin now is regional mgr., Southern kraft paper division. In addition, he is bag division salesman.

Gordon W. Pixler has been appointed to direct expansion of Newport Indus-

tries paper mill technical service in Texas, Arkansas, Mississippi, and Louisiana. . . . Phillip M. Ziegler, formerly engineer, St. Joe Paper Co., now is with forest products division, Olin-Mathieson Chemical Co., W. Monroe, La.

International Paper Company Personnel Changes



Rhodes

C. E. Rhodes, formerly accountant, Natchez, Miss., mill, International Paper Co., will become agent of the company's Georgetown, S. C. mill, Feb. 1. He will replace J. M. Ros, who is retiring. Replacing Mr. Rhodes will be Robert Marler, formerly asst. mill accountant at Natchez. B. E. Lynd has been named asst. power plant coordinator, Southern Kraft division, International Paper Co., Mobile. He had been asst. to the division power engineer since 1951.

Three get promotions at West Virginia lab

Three executives at West Virginia Pulp and Paper Co.'s Covington, Va. research laboratory here have been promoted.

Fred H. Freuler, formerly Covington laboratory research director, now is director of papermaking and mechanical research and development, a newly created post. He will direct paper making

and mechanical research at Westvaco laboratories and will be at the company's New York offices.

Girard L. Calehuff, group leader of fluid mechanics research, succeeds Mr. Freuler.

Joseph J. Kilian, research group leader, has been appointed research director for papermaking process development.

Midwest



Henry E. Wilt is now sales representative for Improved Machinery Inc. in Michigan, Ohio and Illinois. He was formerly asst. pulp mill supt., West Virginia P&P at Luke, Md.

William C. LePage has been named central regional mgr., Mead Board Sales, Inc., and Denny L. Fringer has been placed in charge of the company's Atlanta sales office. Mr. LePage still will be Cincinnati sales district mgr. Mr. Fringer was with the Virginia sales office. . . . David T. McLaughlin has been elected president and a director of West-Pak Corp., Belvidere, Ohio. Robert A. Claridge has been named production mgr. of the company, and Joseph E. Giordano, gen. sales mgr.

Ralph E. White will retire Dec. 31 as vice president, Container Corp. of America after 38 years with the company. Until retirement, Mr. White will continue as vice president, ship- . . . turn to p. 84

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recommendations
designed for the application*

Allispede*

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Accurate speed control

Expert application engineering

An outstanding line of LOUIS ALLIS adjustable-speed drives from 1/2 to 2500 hp.

Louis Allis offers you a complete line of adjustable-speed drives with various characteristics for every application where adjustable speed is required.

Experienced Louis Allis field engineers, supported by regional and factory industry specialists, will help you select the best drive or drive system to meet your requirements.

The Louis Allis line of drives provides outstanding control features ranging from simple manual to precise electronic or transistorized control. Selection of control varies, of course, with the nature of the installation and the precision required. Where desirable, speed regulation as close as .1% is obtainable.

Controls can be provided which automatically respond

to temperature, pressure, or flow. Other control features include threading, inching, jogging, logarithmic acceleration, torque-limit acceleration, tachometer feedback... and many other control provisions that can exactly tailor a Louis Allis drive to your operation.

For process plants or applications involving inter-related motors and multiple drives, Louis Allis engineers can provide complete "systems engineering," furnishing all electrical rotating components and control.

For expert assistance, call your local Louis Allis District Office listed in the Yellow Pages under "Electric Motors"... or write direct to The Louis Allis Company, 444 East Stewart Street, Milwaukee 1, Wisconsin. Ask for Bulletin 2900, "Louis Allis Adjustable Speed Drives."

*TM EATON MFG. CO.

MANUFACTURER OF ELECTRIC MOTORS AND ADJUSTABLE SPEED DRIVES

ASD-238

LOUIS ALLIS

MEETINGS

... October

Packaging Institute, 23rd Annual National Packaging Forum, Biltmore Hotel, New York—Oct. 18-22

PIMA, Miami Valley Div., annual meeting, French Lick Sheraton, French Lick, Ind.—Oct. 19-21

Maine-New Hampshire TAPPI, annual fall meeting, Mountain View House, Whitefield, N. H.—Oct. 20-21

National Paper Trade Assn. fall convention, Conrad Hilton Hotel, Chicago—Oct. 22-25.

... November

TAPPI, Annual Alkaline Pulping Conference, Rice Hotel, Houston, Texas—Nov. 1-3.

Pacific TAPPI, papermaking-screening session, Longview, Wash.—Nov. 14

Manufacturing Chemists' Assn. 11th semi-annual meeting, New York City—Nov. 21

Pacific Coast PIMA annual fall meeting, Olympic Hotel, Seattle, Wash.—Nov. 30-Dec. 2

... December

Virginia-Carolina TAPPI, Jefferson Hotel, Richmond—Dec. 1

Western Forestry & Conservation Assn., 52nd Conference, Benson Hotel, Portland, Ore.—Dec. 6-8

Gulf Coast TAPPI, Battle House, Mobile, Ala.—Dec. 6-8

... January

Connecticut Valley PIMA, Publick House, Sturbridge, Mass.—Jan. 11

Gulf Coast TAPPI, Stafford Hotel, Tuscaloosa, Ala.—Jan. 12-13

Pacific TAPPI, Engineering Conference, Bellingham, Wash.—Jan. 16

Miami Valley Div., PIMA, joint meeting with Graphic Arts Assn., Carrousel Motel, Cincinnati, Ohio—Jan. 18

Michigan Div. PIMA-TAPPI, annual papermakers get-together, Hotel Harris, Kalamazoo, Mich.—Jan. 18

Miami Valley PIMA—Jan. 23

Canadian Pulp and Paper Assn., technical section, annual meeting, Queen Elizabeth Hotel, Montreal—Jan. 23-26

... February

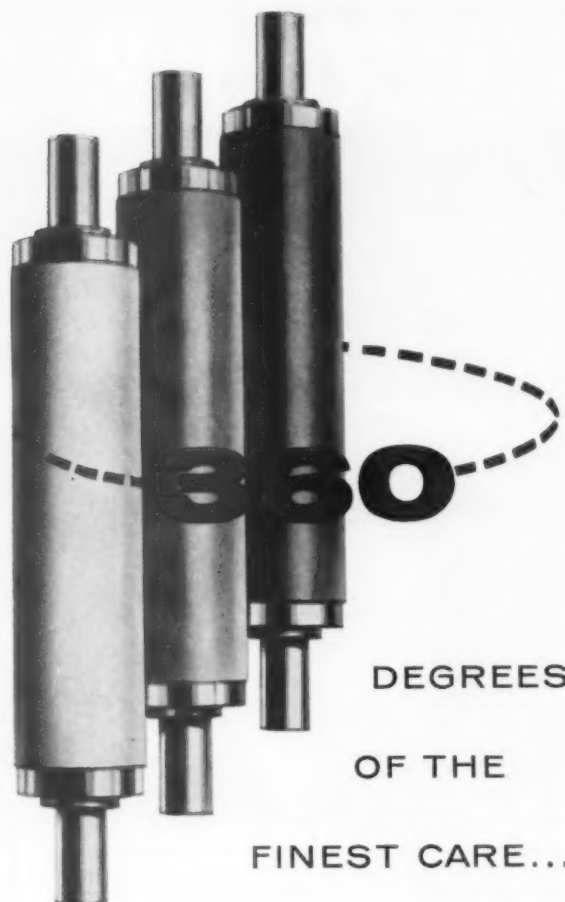
Paper Week: TAPPI, Commodore Hotel; **APPA**, Waldorf Hotel; **APA**, Roosevelt Hotel, New York—Feb. 18-22

TAPPI, 13th Coating Conference, Netherland-Hilton Hotel, Cincinnati, Ohio—May 14-16

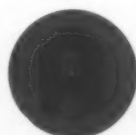
... March

Michigan Div. PIMA, Inman's Restaurant, Galesburg, Mich.—Mar. 15

Pacific TAPPI, Shibley Award meeting, Camas, Wash.—Mar. 20

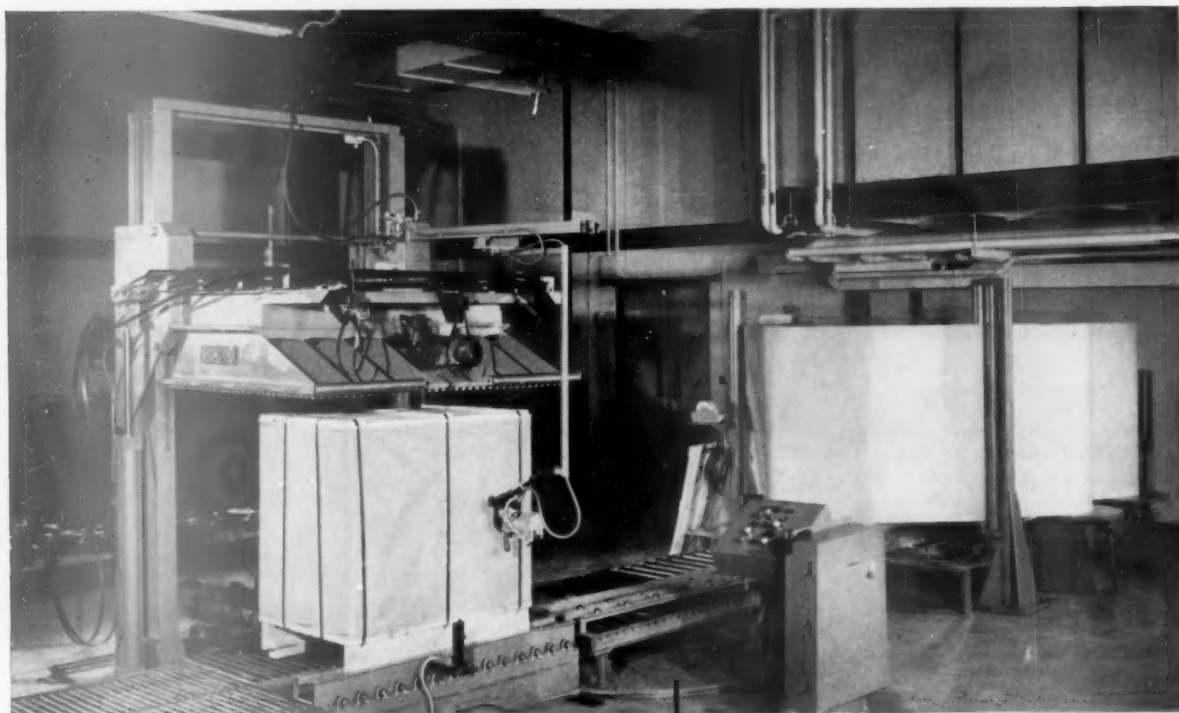


... goes into the manufacture of EVERY APPLETON ROLL—regardless of length, diameter, or end use. In doing this, Appleton can call into play the smallest or largest roll presses in the nation, and some of the most skilled craftsmen. This assures you—our customer—of satisfying your customers' most exacting superfinishing and embossing requirements.



APPLETON
MACHINE COMPANY
APPLETON, WISCONSIN

Two men wrap and strap a skid of paper in 5 minutes!



As this skid moves into the compression strapping station, the lengthwise straps drape around the load. The skid automatically stops in position in the press so that saber chutes can extend through notches in the skid runners. Then one, three, or five girth straps can be power fed to the operator, who completes the compression strapping operation while the other man prepares the wrapping station for the next cycle.

A skid load of paper drapes itself with protective paper as it moves along the conveyor. The wrapper is held across the conveyor by a pneumatic clamp on the far side, and feeds from rolls through a guide on the near side. Then the skid is stopped. Two men complete the wrapping operation. Total time: about two minutes.

New Signode skid packaging station

- ...pre-drapes protective paper**
- ...pre-drapes longitudinal straps**
- ...feeds girth straps through notches in skid runners**

Now production line packaging of skids of paper is a reality—a fast, smooth-flowing operation of which many parts are automatic. The entire job takes about five minutes with two men.

If this seems to mean that you can now put about 90 skids of paper through your strapping machine in 16 man-hours, you're right. What's more, your Signode man can be there in a hurry to tell you more about it. Call him, or write to Signode, today.

Let us show you our new 20 minute 16mm color movie on compression strapping in the paper industry.



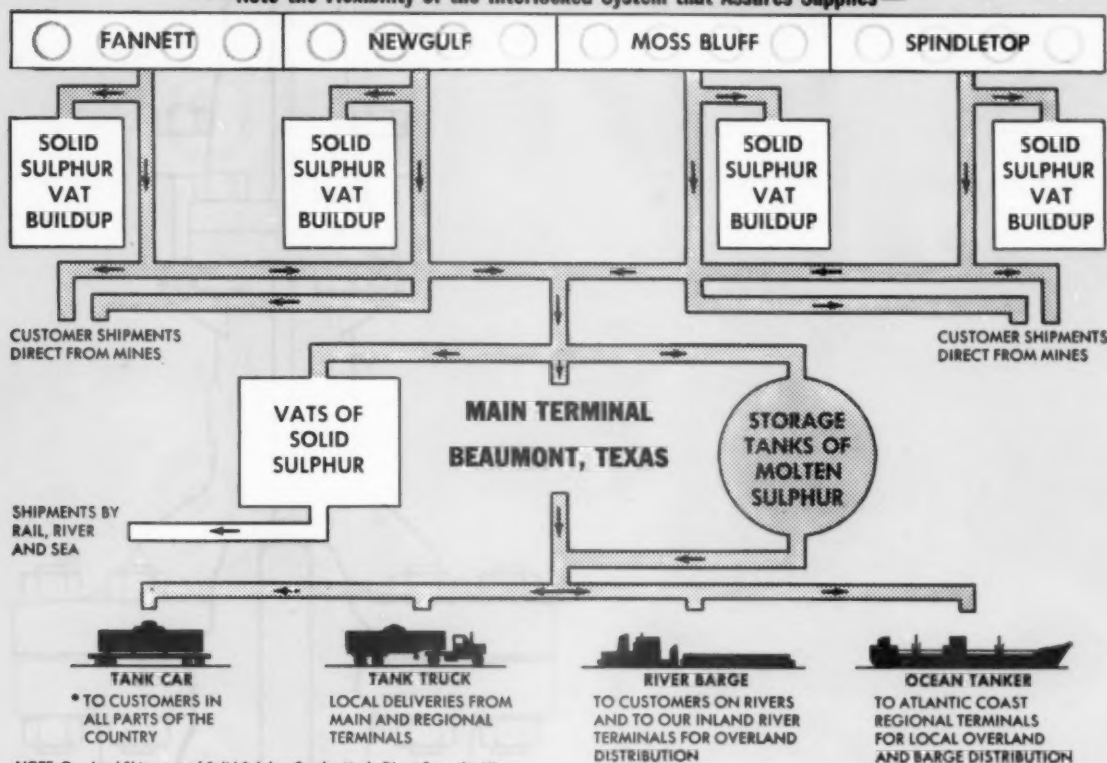
First in steel strapping

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molten sulphur

HOW TGS MOLTEN SULPHUR TRAVELS FROM FRASCH MINES TO CUSTOMERS

— Note the Flexibility of the Interlocked System that Assures Supplies —



NOTE: Overland Shipments of Solid Sulphur Can be Made Direct From the Mines
 Flow of Molten Sulphur

Flexible Facilities to meet a Growing Demand

The rapidly growing demand for deliveries of sulphur in molten form—and it is coming from all parts of the country—is well answered by the flexibility of our production, storage and distribution facilities.

Here, graphically, is the way TGS Molten Sulphur moves from the four Frasch Process producing areas in Texas to customers. Unusual flexibility enables us to do several things simultaneously. We can fill orders direct from the mines, build up inventory at our main terminal in Beaumont, Texas, ship to customers from this main terminal

or supply our regional terminals.

We maintain steady production schedules at all properties. With flexible storage, shipping and delivery facilities of not only molten sulphur but solid sulphur, we are in a strong position to serve the sulphur-consuming plants all over the United States and Canada.*Our sulphur recovery plants (from natural gas) in Wyoming and Alberta take care of the demand in north-west United States and Western Canada for both molten and solid sulphur.



TEXAS GULF SULPHUR COMPANY

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811 Rusk Avenue, Houston 2, Texas

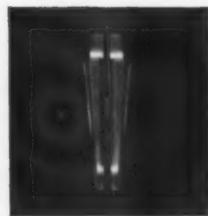
Sulphur Producing Units: Newgulf, Texas • Moss Bluff, Texas

• Fannett, Texas • Spindletop, Texas • Worland, Wyoming

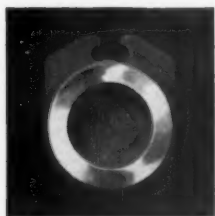
• Okotoks, Alberta, Canada



Walworth's last word in positive sealing! When valve bodies are tortured out of shape by line pressure, temperature or deflection—new Walworth living wedge Gate Valves still seal tight! It's because of Walworth's unique one-piece split disc gate that lives in the body...flexes and gives, to stay mated to the seat in spite of body distortion. Yet new Walworth living wedge Gate Valve operates at low torque, can't bind, jam or stick—and is economical, needing



WEDGE



minimum replacements. Get new Walworth living wedge Gate Valves in 150 and 300 pound ASA ratings, 2" to 24". See your Walworth distributor for details, or write to Walworth Company, 750 Third Avenue, New York 17, N. Y.

WALWORTH

the Walworth companies: Alloy Steel Products Co.—Conoflow Corporation—Grove Valve and Regulator Co.—M & H Valve and Fittings Co.—Southwest Fabricating & Welding Co., Inc.



for improved bonding,
higher solids content,
better pigment dispersion
use CALGON*
in your coating formula

Calgon improves coating formulas in several important ways. Its high efficiency as a dispersing agent of clay, titanium dioxide, precipitated calcium carbonate and other pigments results in smoother coating colors. Flow properties are improved, and higher concentrations of solids may be used. Calgon also improves the bond between coating and paper stock.

These are some of the reasons why most of the nation's leading producers of coated papers and coated boxboards use Calgon. They also rely on Calgon's Technical Service for assistance on a wide variety of water problems.

Calgon is also useful in controlling a number of water conditions in paper mills. For example, added in only a few ppm to high bicarbonate water, it inhibits the precipitation of calcium carbonate when the water is heated or treated with alkali, and prevents harmful scale formation when washing de-inked paper stock or alkaline pulps.

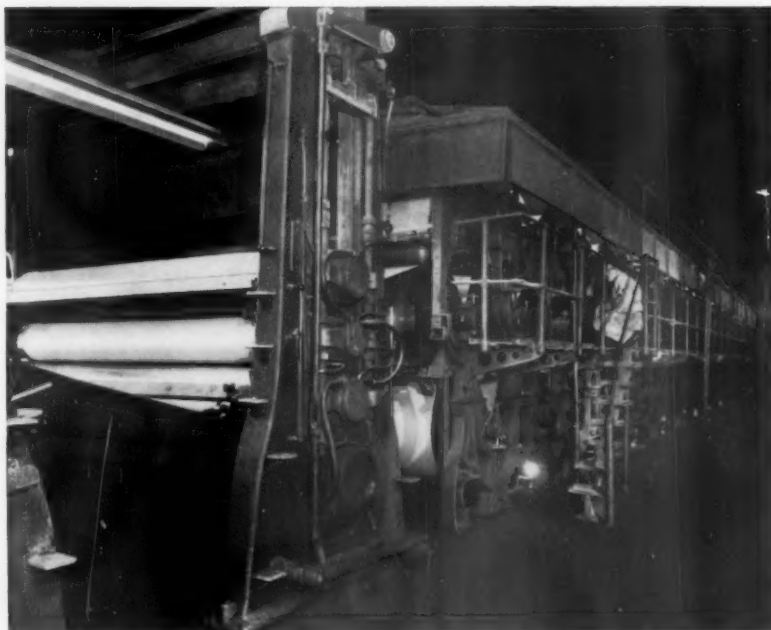
Calgon added to corrosive water in similar amounts controls corrosion of pipe lines, reducing iron pickup to less than 0.1 ppm, and thus inhibits the breakdown of peroxide solution as in the bleaching of groundwood pulp.

Several years of use have proved that Synoca (Calgon felt washing compound) gets even the dirtiest felts super-clean, softer and more absorbent.

If you have a problem, call on Calgon. A new brochure, "Calgon in Industry" is available on request. Write to CALGON COMPANY, Hagan Center, Pittsburgh 30, Pa.

*Calgon is the registered trademark of Calgon Company for its sodium phosphate glass (sodium hexametaphosphate) products.

HOW HAGAFILM STOPPED RETURN LINE CORROSION, REDUCED DAILY FUEL COSTS at Whippany Paper Board Company



Quick case history—reading time 58 seconds

THE PLANT: One of the nation's largest producers of paper board and cardboard, Whippany Paper Board Company's Clifton, New Jersey plant uses secondary steam to progressively reduce moisture content in their products during manufacture. Steam is used to heat the more than 20 rolls in each paper machine to effect this drying.

THE PROBLEM: High corrosive action of the condensed steam necessitated replacement of 18-20 pipe nipples every three weeks, raised maintenance costs. Corrosion deposits in pipes impeded heat transfer effectiveness, increased fuel costs. Steam traps frequently clogged.

THE SOLUTION: Since introduction of Hagafilm into boiler feed-water system three years ago, no pipe nipples have needed to be replaced due to corrosion. Hagafilm cleaned out corrosion deposits, raising surface temperature of the dryer rolls about 20° F. Steam trap clogging is no longer a problem.

TEST RESULTS: Hall Laboratories engineers, testing the system, had to wait five months before testing strips showed enough corrosion to even be measured. After five months, the strip located at the turbo-generator outlet showed the extremely low corrosion rate of 0.4 mg/dm²/day (0.07 MPY). The strip at the steam trap discharge had a similar low corrosion rate of 1.4 mg/dm²/day (0.26 MPY).

FOR FULL INFORMATION on how Hagafilm can help in your plant operation by putting a thin protective film on metal surfaces throughout the condensate system, contact Hagan Chemicals & Controls, Inc.

HAGAN

CHEMICALS & CONTROLS, INC.
HAGAN BUILDING, PITTSBURGH 30, PA.



HAGAN DIVISIONS: CALGON CO.—HALL LABORATORIES—BRUNER CORP.

HC-34452

PULP & PAPER—October 16, 1961

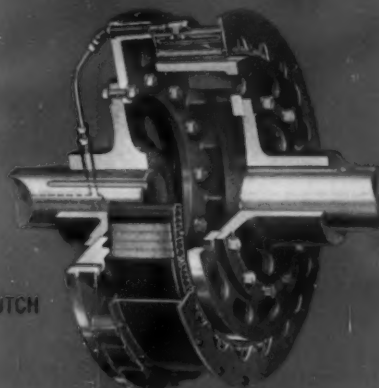


**these
manufacturers
insure top
performance...**

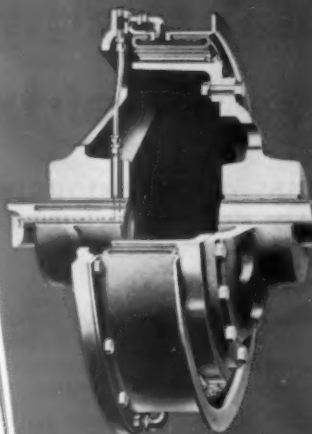


PATTON

Standard complete air clutch developed for heavy-duty dryer and calender applications. Cool-running ventilated design allows inching of most dryer sections. Available in 14 sizes with torque ratings from 27,000 to 1,800,000 in.-lbs. at 75 psi.



VC VENTORQUE CLUTCH



CB AIRFLEX CLUTCH

Standard complete air clutch-coupling for section drive service. Available in 21 sizes with torque ratings from 2,040 to 1,130,000 in.-lbs. at 75 psi.

**with
Fawick
Air Clutches!**

These leading paper machinery manufacturers use Fawick air-actuated clutches as original equipment for one basic purpose — to give their customers the kind of power transmission and control that assures the most efficient production!

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INDUSTRIAL CLUTCHES AND BRAKES



you can see the sense to **HILLS-McCANNA** **Diaphragm** **Valve Design**

... now, with the most extensive
line of lowest cost operators
available!

When you look into a Hills-McCanna diaphragm valve, you immediately see that all of the working parts are sealed off by the tough resilient diaphragm which also serves to control the flow. Consider the operating advantages:

LEAKTIGHT SHUTOFF—even against solid particles which might lodge on the seat.

NO CONTAMINATION OF FLOW—especially important with foods, syrups, antibiotics, or any sanitary application.

PROTECTION of working parts against corrosive action of acids, alkalies, other materials.

NO PACKING, hence no leakage around stem. Toxic, corrosive, and flammable fluids are safely contained.

SELF-CLEANING DESIGN, simple maintenance, excellent throttling control.

COMPLETE LINE—1/2" through 16" sizes—screwed, flanged, socket weld, and other end connections . . . pressures to 150 psig, temperatures to 400° F . . . more than 10,000 combinations of bodies, bonnet assemblies, and diaphragm materials to fit your service needs.

ASK FOR CATALOG No. 104 giving complete specifications and service recommendations.

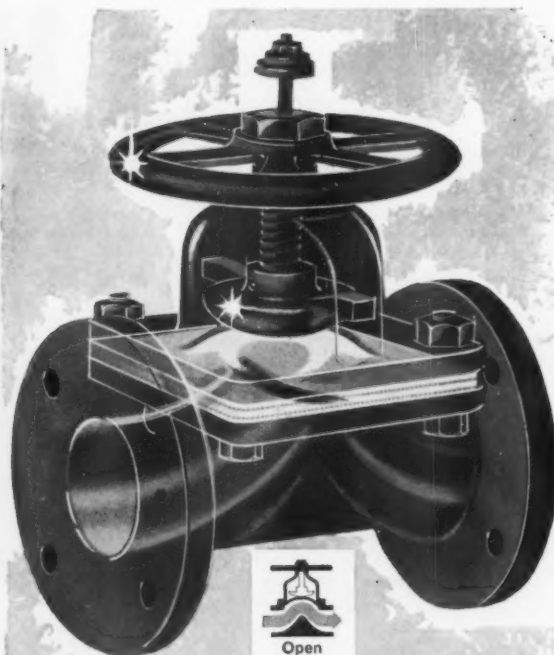


Valves and parts stocked nationwide
by leading industrial distributors

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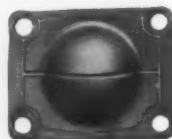
What these valves really control
is cost!

DV61-2



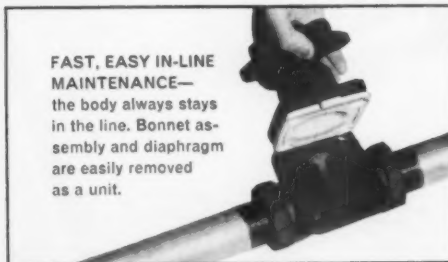
Here's real economy in remote control!

The low cost, high reliability, and compact size of Hills-McCanna air-operated diaphragm valves make them an outstanding buy for automatic and remote control service. Be sure to ask for Bulletin 134-A.



SUPERIOR DIAPHRAGM DESIGN—patented sealing bead prevents leaks where others fail. Less closure force is required, longer life is insured. Available materials include reinforced elastomers and solid plastics.

**FAST, EASY IN-LINE
MAINTENANCE**—the body always stays in the line. Bonnet assembly and diaphragm are easily removed as a unit.





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Water

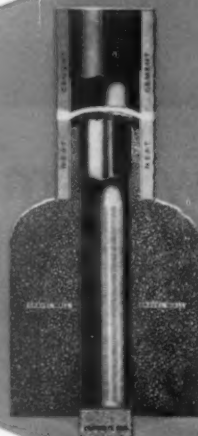
From top to bottom, you can depend on Layne for the most complete water service in the industry. This complete service provides undivided responsibility for the delivery of water . . . of the quality and in the quantity required. Over 75 years of growing service gives the skill and technical know-how which makes Layne First in the field of water. For additional information write for bulletin 10.

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OFFERS COMPLETE
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Initial Surveys • explorations
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• water treatment—all backed by Layne Research.
Layne services do not replace, but coordinate with the services of consulting, plant and city engineers.



Layne Vertical Turbine Pumps are designed, engineered and manufactured by Layne in Memphis, Tennessee and nowhere else. Because pumping needs vary, there is a Layne pump for every pumping requirement—from 30 to 100,000 G.P.M. in sizes from 4 to 42 inches. Layne Pumps include Deep Well and Short Coupled (oil or water lubricated), Propeller, Mixed Flow, Regular and "In-Line" Submersible. For additional information write for bulletins 200-oil lubricated or 201-water lubricated.



The Layne Gravel Wall Well is an example of Layne experience, engineering and research. This gravel packing and 134 shutter screen employment affords larger screen openings, reduced friction, reduced draw down and pumping head. It increases specific capacity and makes for more effective retention of native sands. For additional information write for bulletin 900.



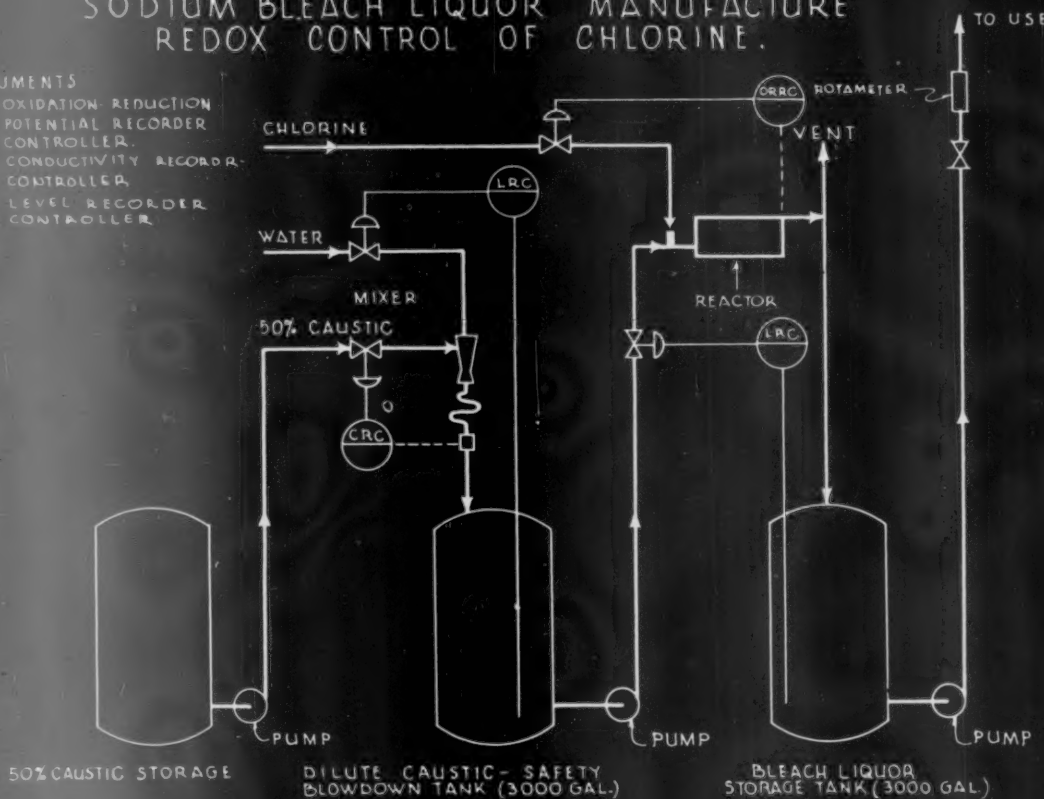
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How to make bleach liquor automatically and continuously

With this simple Hooker system you can produce sodium hypochlorite* continuously and automatically. Control of bleach-liquor composition is automatic, resulting in more uniform bleach and an improved final product.

Chemical costs are at a minimum, because excessive chemical usages are eliminated. Labor costs are also at a minimum, since the plant operates automatically and requires only occasional supervision. Installation costs are lower, because large reaction and storage tanks are not needed.

HOW THE SYSTEM OPERATES—50% caustic soda and dilution water are metered to a caustic-dilution tank. A level-controller adjusts the flow of water to match the rate of withdrawal of bleach from the unit.

A conductivity controller meters the 50% caustic solution

to maintain a constant dilute caustic concentration (3-5%).

Dilute caustic soda solution is pumped through a custom-designed Hooker reactor, of which there are several types, and combines with chlorine to form soda bleach.

The flow of dilute caustic is controlled by a level-controller in the bleach-liquor storage tank, while the chlorine addition is controlled by the oxidation-reduction recorder controller.

If you need relatively large amounts of 30-to-40-gram-per-liter available-chlorine bleach liquor on a continuous basis, this Hooker system can cut your costs by a considerable margin while giving you the top quality you want. For more information on this process, write for Bulletin No. 251, "Continuous Bleach Liquor Manufacture."

*A similar system with a modified reactor is available for calcium hypochlorite.

HOOKER CHEMICAL CORPORATION

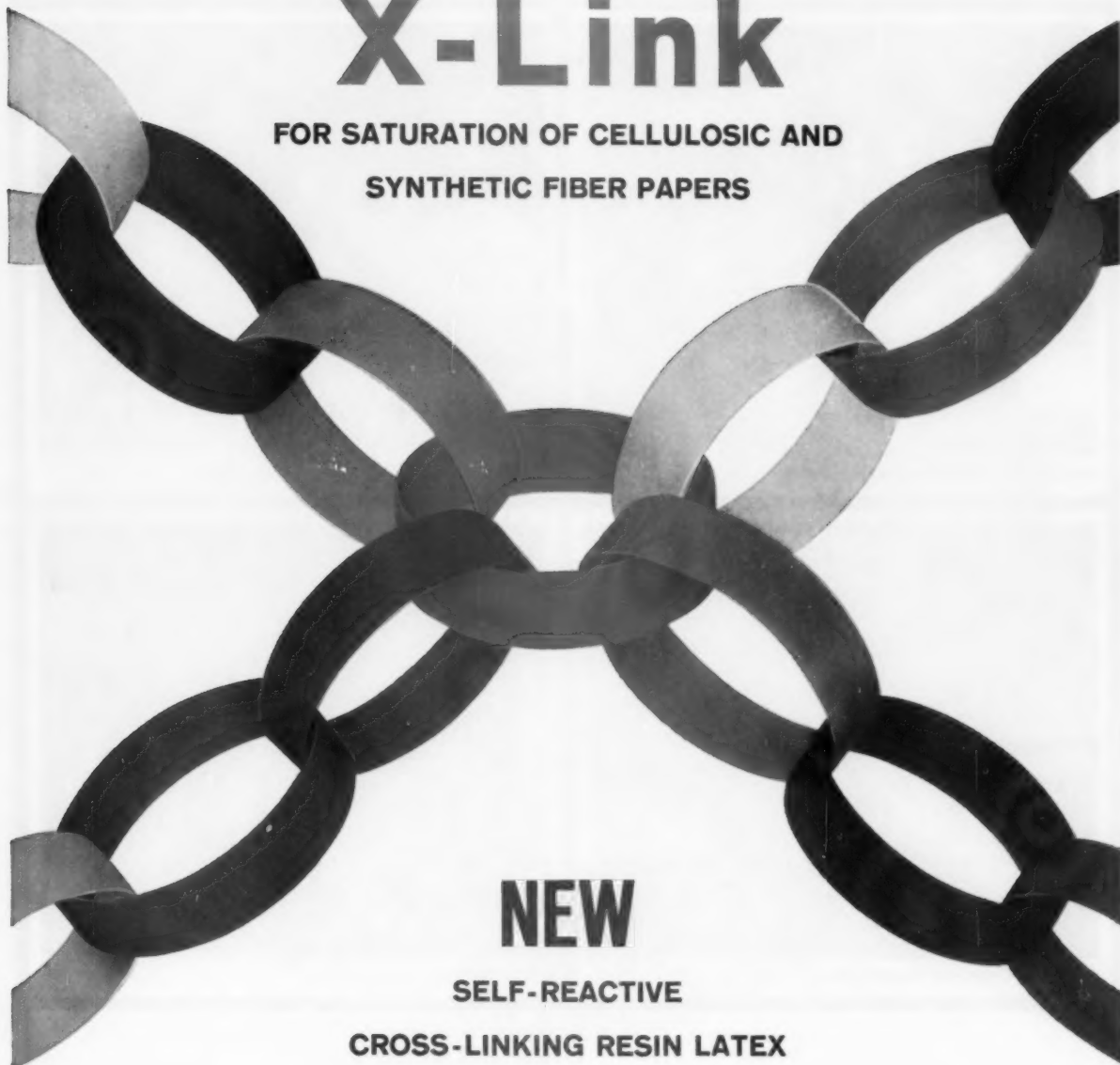
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Sales offices: Buffalo, Chicago, Detroit, Los Angeles, New York, Niagara Falls, Philadelphia, Tacoma, Worcester, Mass. In Canada: Hooker Chemicals Limited, North Vancouver, B. C.

HOOKER
CHEMICALS
PLASTICS

X-Link

FOR SATURATION OF CELLULOSIC AND
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SELF-REACTIVE
CROSS-LINKING RESIN LATEX

X-LINK reacts with itself upon drying to form structures with exceptional properties: unusual resistance to heat, water, solvents, chemicals, discoloration; very strong, flexible films. It produces extremely high tensile strengths concurrently with high tear characteristics.

X-LINK is self reactive. A cross-linking acrylic copolymer latex that requires no compounding or formulat-

ing. It overcomes problems of stability, odor, high curing temperatures and compatibility encountered with other thermoplastic polymers which require addition of thermosetting type resins for cross-linking.

X-LINK is designed for saturation of cellulosic and synthetic fiber papers of all types. Full details are now available. Just write or call your National office.

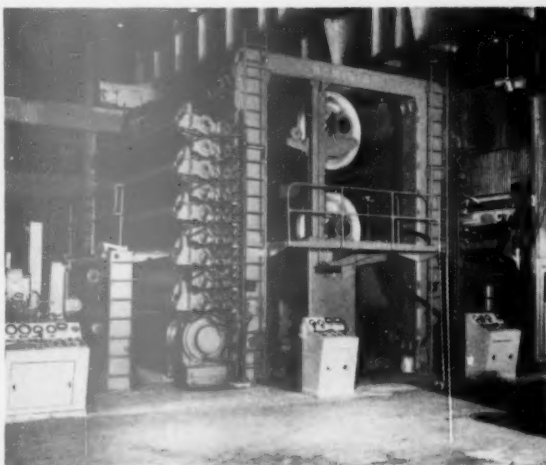
National
RESINS

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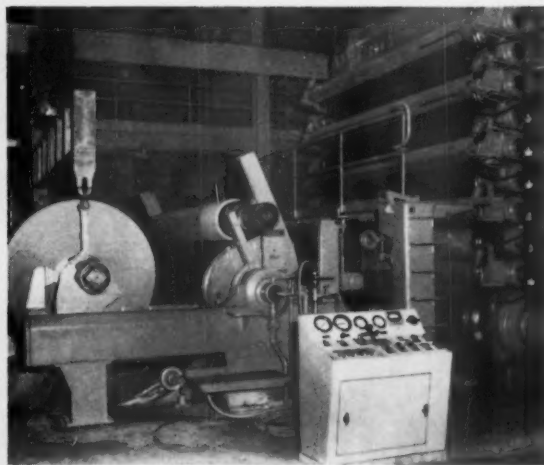
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• 3641 So. Washtenaw Avenue, Chicago 32

• 735 Battery Street, San Francisco 11



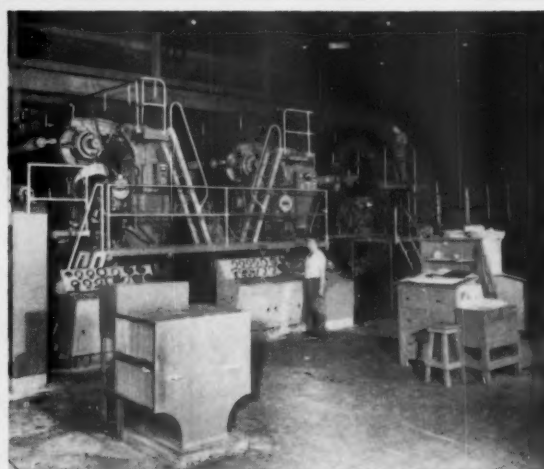
Double open-sided Calenders with inter-calender Dryers.



Constant Tension Reel.



Section of Dryer and Breaker Stack.



Press Section.

LA TUQUE MILL,
CANADIAN INTERNATIONAL
PAPER COMPANY LIMITED

The sections shown above of the
KRAFT SPECIALTY MACHINE
were designed, engineered and produced
by DOMINION ENGINEERING,
Canada's oldest, most progressive
maker of pulp and paper machinery.

For new installations, re-building, modernizing, please contact
Paper Division,

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Company Limited

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installed at  **St. Francisville Paper Co.**
St. Francisville, La.

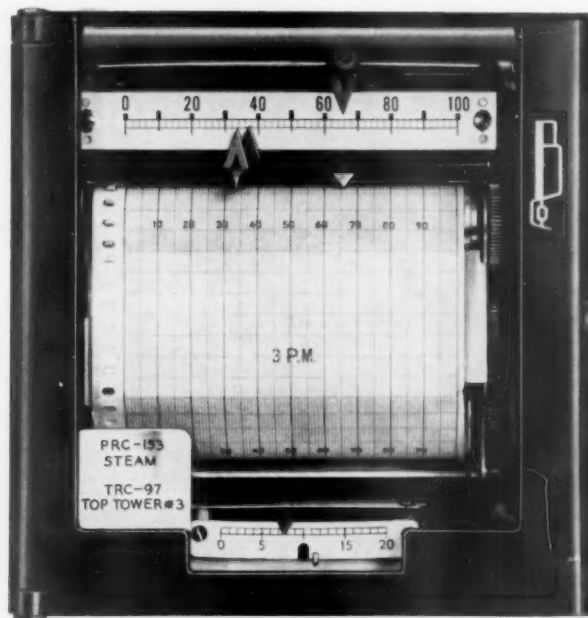
Ross Engineered Air Systems handle process air in all vital mill areas including:

Grinder room, screen room, bleaching plant, washer room, stock preparation area, machine room, clay coating and mix plant, and finishing room.

Complete, balanced air systems so important in today's pulp and paper production, under one responsibility.

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New Bristol Series 670 Metagraphic receivers measure only 7" wide by 7½" high on panel, come in a wide selection of models, including 1-, 2-, and 3-pen models and models with manual-automatic, manual-cascade, and manual-auto-matic-cascade control stations.

Now: the USER-PLANNED Receiver New Bristol Metagraphic

offers you more features for easy installation, flawless operation, and fast,

no-down-time servicing than any other 4-inch-chart pneumatic receiver.

At last, here's the ideal pneumatic receiver for graphic panel applications.

It's Bristol's new Series 670 Metagraphic, the receiver with complete plug-in versatility and convenience, plus these new user-designed features:

Simplified control switching between functions—Allows the easiest start-up procedures for automatic or cascade operation. Just adjust process to line up color-coded indicators and switch to automatic or cascade operation as desired.

Uniform control switching—All receiver models have the same convenient, easy-to-remember switch positions for the various types of control: cascade position, 3 o'clock; manual position, 6 o'clock; and automatic position, 9 o'clock.

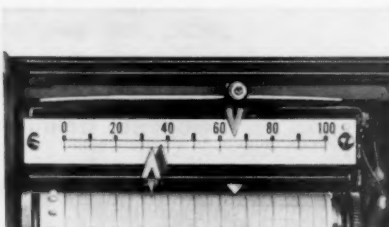
Simplified chart change and inking—Chart changing is a one-hand operation. A new chart can be slipped into place in an instant. The capillary inking system can be filled from the front of the receiver.

And that's not all: Series 670 gives you such outstanding features as rectilinear chart coordinates for easiest reading, easy connections for any type of control, and sparkless mercury-switch disconnect of electrical circuit when plug-in chassis is withdrawn.

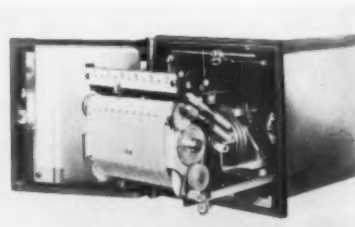
Write for complete data on the new Series 670 today. The Bristol Company, 143 Bristol Road, Waterbury 20, Conn., a Subsidiary of American Chain & Cable Company, Inc.



Simplified, uniformly-planned control switching facilitates process start-up and operator training.



Brightly-colored distinctively-shaped pointers signal process deviation from set-point, even at a distance.



Complete plug-in versatility—long a Metagraphic feature—insures continuity of service.

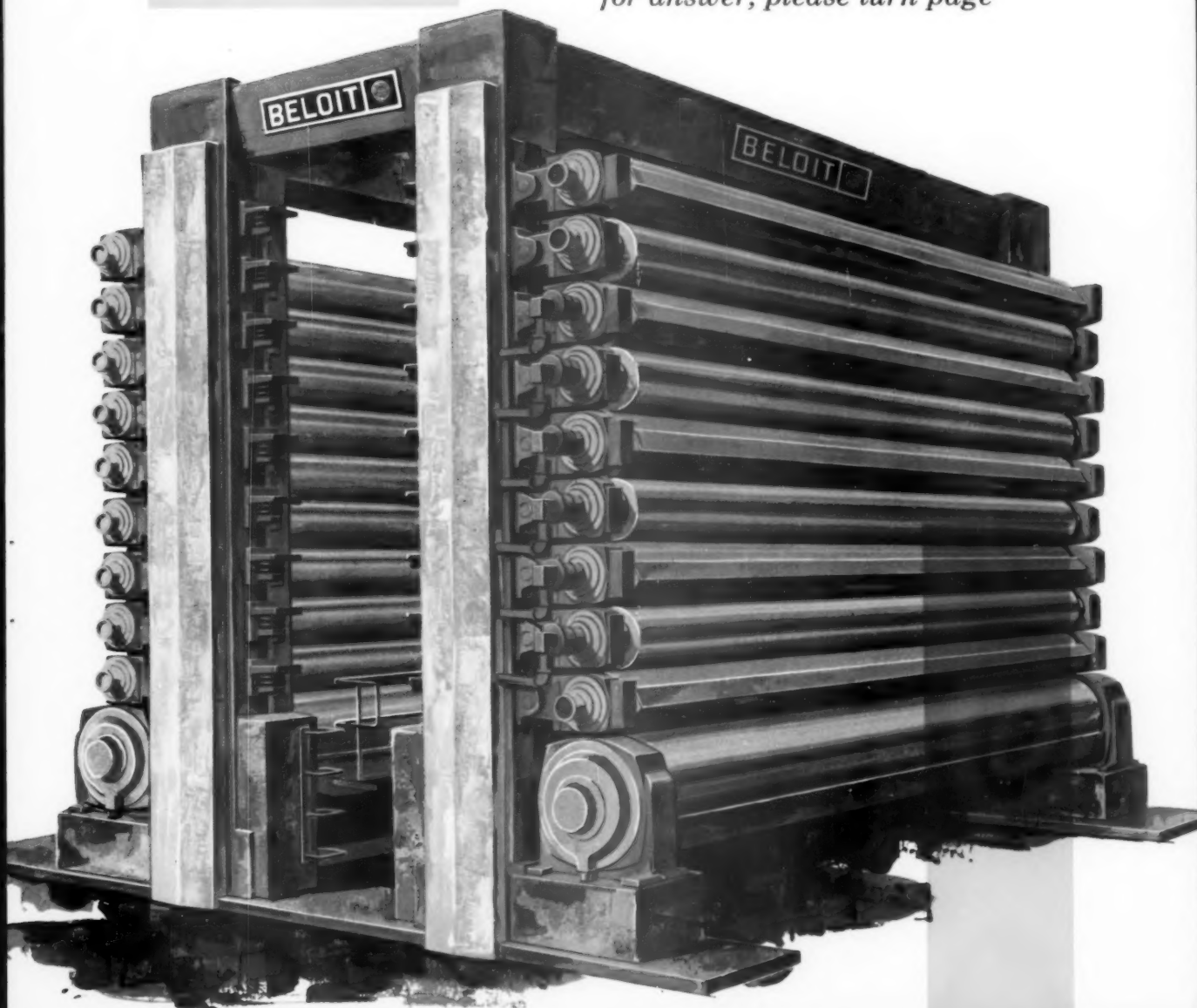
BRISTOL ... for improved production through measurement and control
AUTOMATIC CONTROLLING, RECORDING AND TELEMETERING INSTRUMENTS

what features
and advantages
does the new

BELOIT CALENDER

design bring
to papermaking?

for answer, please turn page



BELOIT CALENDERS

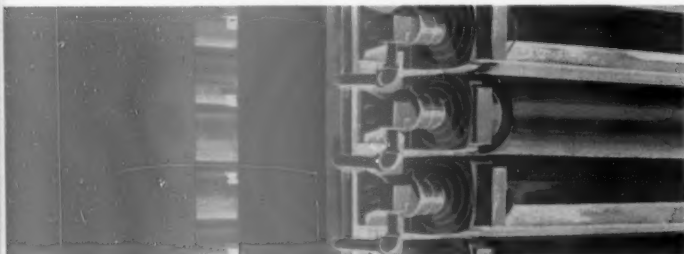
...new concept provides more
efficient and economical operation

The new Beloit Calender shown here represents a major breakthrough in calender design and gives promise of greatly increased operating efficiency. Every feature of this new-type machine calender reflects rugged dependability, operator convenience, and ease of operation. Location of roll-lift mechanism in the base eliminates the necessity for service ladders and footwalks, and substantially

lowers the over-all calender height. Other important features:

- rapid, positive roll removal
- direct air-cushioned loading and nip relieving
- rolls individually supported in raised position
- operating ease and accessibility.

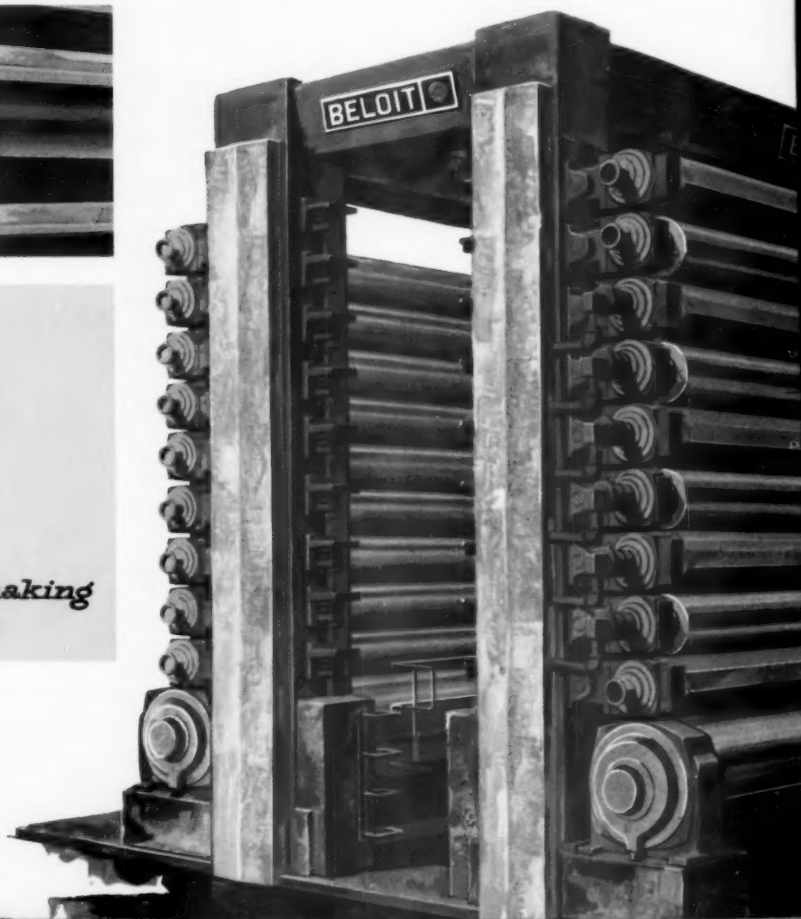
Descriptive literature upon request.



BELOIT

PAPER MACHINERY

your partner in papermaking



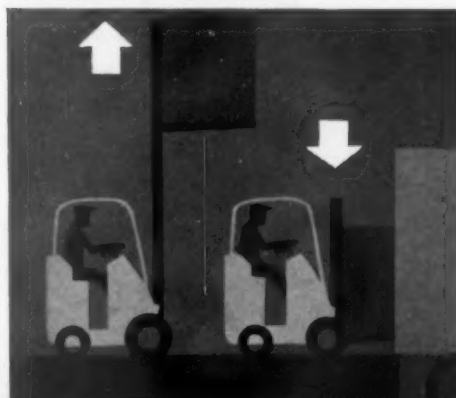


TOWMOTOR'S ON THE MOVE

—broadening industry's concept of low cost material handling. Advancing the modern "compact" idea with small but mighty lift trucks that move around fast—pick up ton-loads—stack high in warehouse—duck low into trailers—do many jobs instead of a few. Keep on the move with Towmotor fork lift trucks—made only by TOWMOTOR CORPORATION, CLEVELAND 12, OHIO.



Raising unit loads 18' high one minute, then driving into low-clearance vans the next, is one of the unique features of new Towmotor "Van-Stack" Series fork lift trucks (above). These 32" wide "compacts" zip through 3-foot aisles, maneuver sharp corners, hustle big jobs with unusual economy.



Diamond spent \$millions to cut

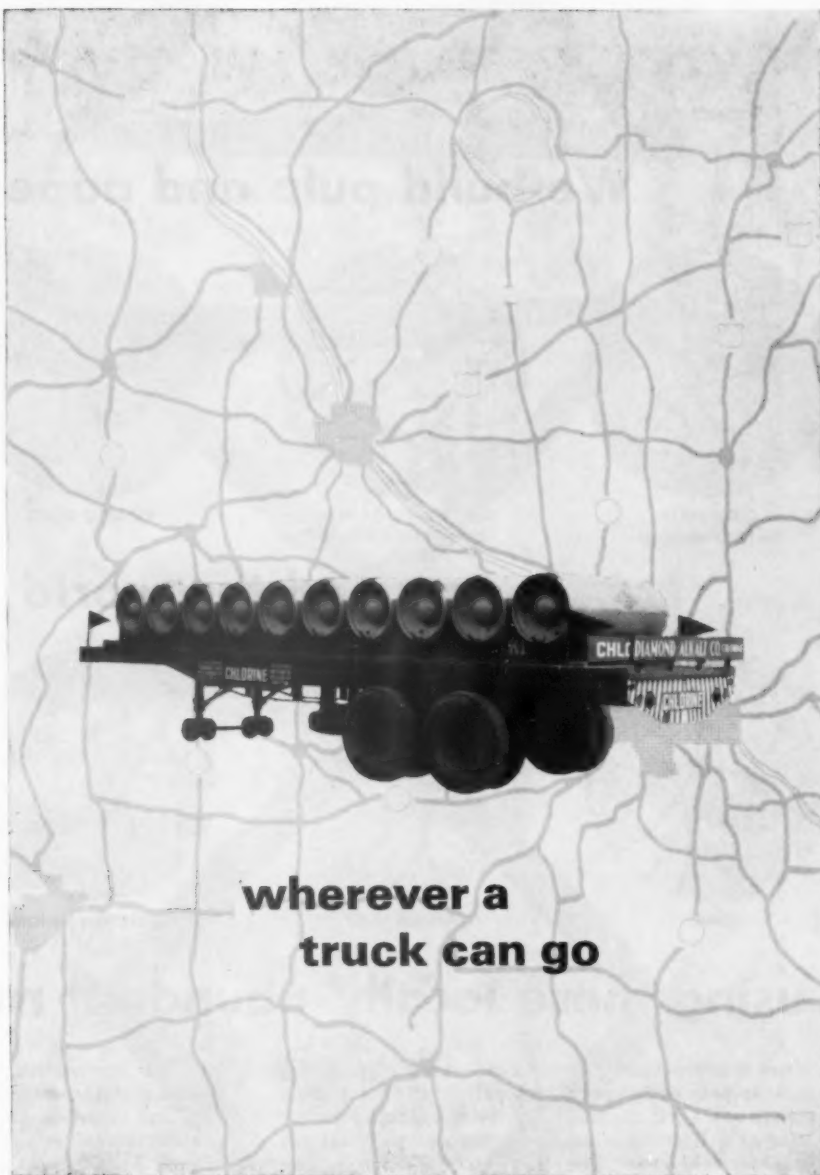


Diamond delivers liquid chlorine safely from four strategically located plants, regularly to fit in with your production schedules and uniformly to assure you quality every time ■ DIAMOND has invested millions of dollars in "packages" ranging from 100- and 150-lb. cylinders . . . to 15 one-ton containers clamped on special flatcars . . . ton containers on special hi-way trailers . . . to tank cars . . . to 600-ton barges.

your delivered chlorine costs



railroad goes



**wherever a
truck can go**

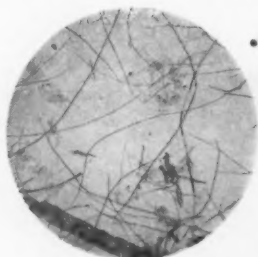
■ DIAMOND backs up its customer's delivery service with a highly trained technical staff to answer your questions, advise you on liquid chlorine handling and economical use, and help you set up the most economical shipping schedules. For DIAMOND's Chlorine Handbook and a fully illustrated Chlorine Wall Chart, write DIAMOND ALKALI COMPANY, 300 UNION COMMERCE BUILDING, CLEVELAND 13, OHIO.



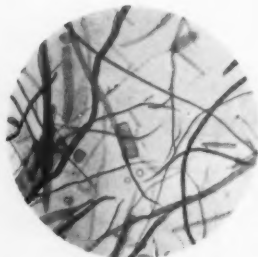
Diamond Chemicals



WHEAT STRAW



RICE STRAW

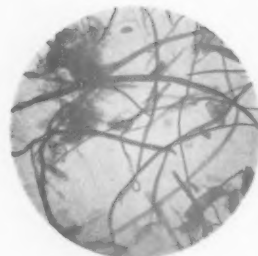


REEDS
(*phragmites communis*)

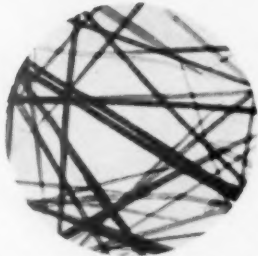


ELEPHANT GRASS
(before cleaning)

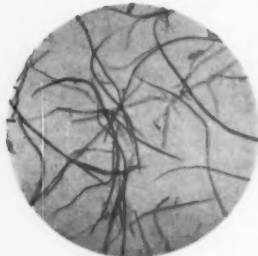
We build pulp and paper mills



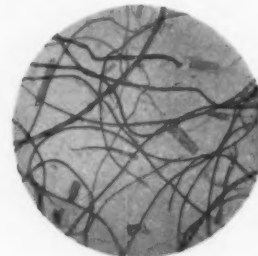
CORN STALK
(before depithing)



SUGAR CANE BAGASSE
(completely depithed)



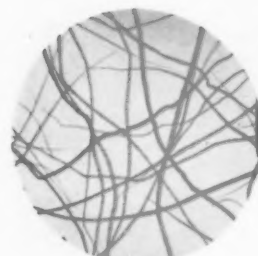
ESPARTO GRASS



BAMBOO

around the world

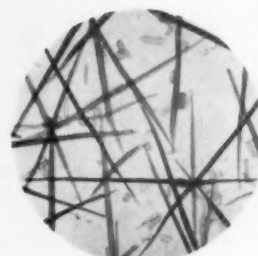
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approx. 35x



KENAF



MANILA HEMP



EUCALYPTUS SALIGNA



MONTEREY PINE

using these locally-abundant raw materials

Many countries have improved their economic position by making pulp and paper from locally-abundant grasses, woods and agricultural fibers. They began by having Parsons & Whittemore conduct a thorough technical and economic field survey. The selection of the proper process and equipment for use of such fibers is dependent upon many factors that can only be properly evaluated by highly-experienced personnel.

Field research is only one of Parsons & Whittemore's serv-

ices. Our organization has world-wide technical, financial and machinery-manufacturing facilities that enable us to plan and supervise the designing, engineering, financing, construction and equipment of pulp and paper mills in any country having the required raw materials. We will even train local workers to operate the mill...and our branch offices will arrange for the sale of the plant's pulp and paper output on world markets. For information on any or all of these services, write to our nearest office.

THE PARSONS & WHITTEMORE / LYDDON ORGANIZATION

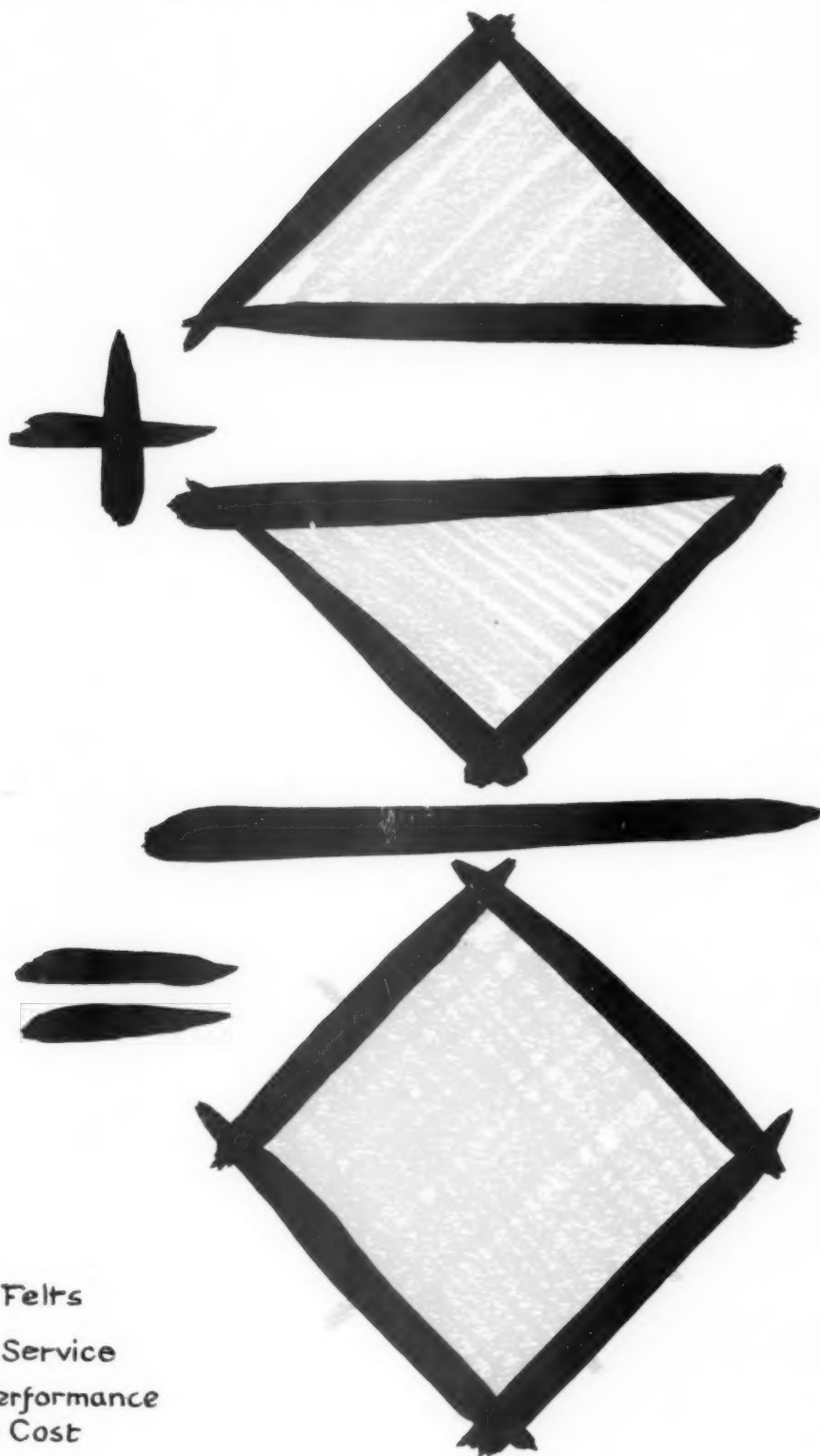
World leaders in the development of pulp and paper mills for the use of local fibers

18-19 Savile Row, London W. 1, England



5 Rue Jean Mermoz, Paris 8°, France

250 Park Avenue, New York 17, N. Y.



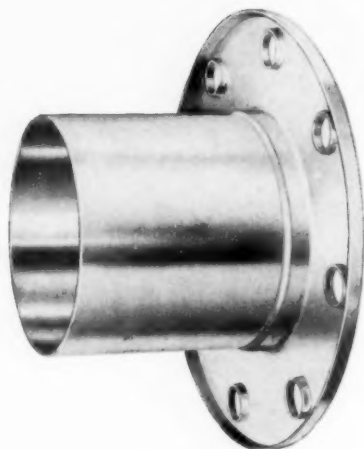
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ONE DILUTION takes 12% stock down to a uniform 5% in dual-purpose chest at Canada Paper Company, Windsor Mills, Que.

See the two stock chests in this picture?

Engineers at this mill solve a serious storage problem—by making this *one* stock chest do the work of *two*. A LIGHTNIN Side Entering Agitator helps them do it.

High-density unbleached kraft stock feeds into the 60-ton chest from the brown-stock washers at a consistency of 12-16%.

Out of the same chest comes stock diluted to a uniform 5%. It goes right to the refiners. No second chest is needed for leveling out consistency fluctuations. Refiners operate smoothly—even though there's no consistency regulator in the system.

How it works

Mixing takes place in the chest bottom. Here, in an 8-foot-deep zone of reduced diameter, the LIGHTNIN Agitator swiftly and continuously blends stock with incoming dilution water. Consistency of stock anywhere in this zone varies less than 0.1% (bone-dry basis)

from the specified average.

There's no need for auxiliary high-pressure jets. Stock above the mixing zone can't stagnate or channel. It moves downward in fully predictable plug flow, is peeled off steadily by the agitator, and is rapidly and evenly diluted to 5%.

This is no accident. When you use LIGHTNIN Agitators in your stock chests, you can specify exactly the performance you want—and get it.

Let your LIGHTNIN representative show you how. His name is in Thomas' Register. Or write directly to us.



FROM THIS ZONE, stock goes directly to refiners, mixed to within $\pm 0.1\%$ of required consistency by the LIGHTNIN Side Entering Agitator.

Lightnin® Mixers

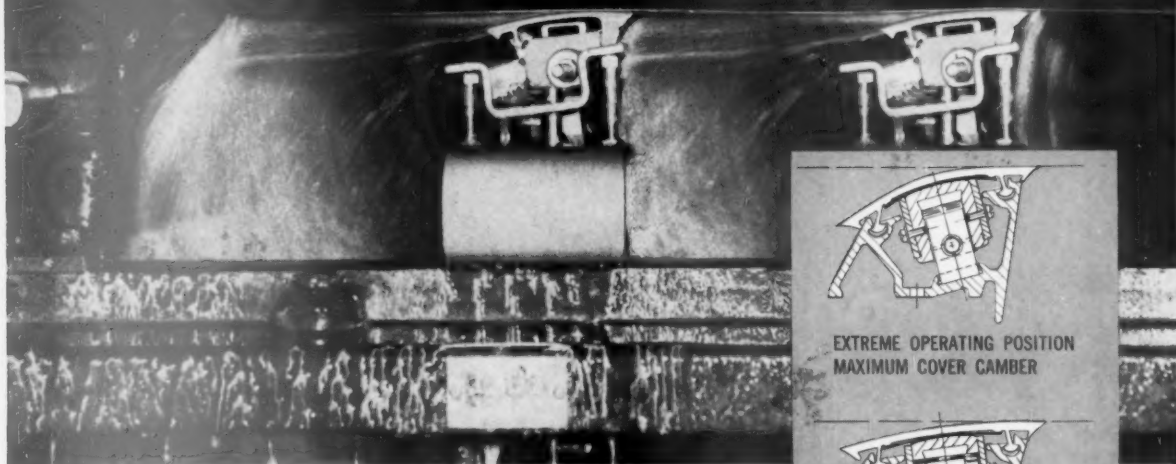
MIXCO fluid mixing specialists

MIXING EQUIPMENT Co., Inc., 141-k Mt. Read Blvd., Rochester 3, N.Y.
 In Canada: Greey Mixing Equipment, Ltd., 100 Miranda Ave., Toronto 19, Ont.
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Improved Sheet Formation — Controlled Drainage

with the
NEW
.....

LODDING Wire Doctors



DISRUPTIVE PRESSURE RIDGES, WIRE SAG AND SNAP BACK — obstacles to good sheet formation — are eliminated where table rolls are replaced with Lodding Adjustable Fourdrinier Wire Doctors. Wet streaking and worming of the sheet caused by table rolls disappear. Improved formation results.

Optimum wire drainage is achieved by adjusting the Wire Doctor cover. The camber of the cover, height and tilt of the Wire Doctor are easily adjusted while the machine is operating.

With Lodding Wire Doctors available, drainage area is utilized far more than is possible with table rolls. Improved productivity — increased production — result.

Lodding Wire Doctors consist of a semi-rigid, extruded cover, a standard size head assembly (designed to position the cover vertically and regulate its camber) a support beam and mounting brackets.

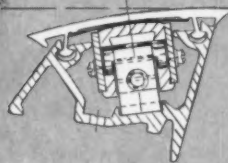
The Fourdrinier wire is supported by the cover, which doctors excess water from the underside. Also, the cover induces drainage through a vacuum created between the wire and the cover.

Many progressive papermakers are reaping the benefits of Lodding Wire Doctors on machines making glassine, book, newsprint, groundwood specialties, tissue and light weight fine papers and others at speeds of 100 to 2000 fpm, at widths up to 276 inches. Whatever stock you are running, it will pay you well to learn more about this proven way to increase the productivity of your Fourdriniers. Send today for Bulletin No. 6005. It describes the Lodding Adjustable Fourdrinier Wire Doctor in detail.

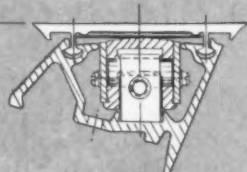
LODDING
Engineering Corporation
AUBURN, MASSACHUSETTS



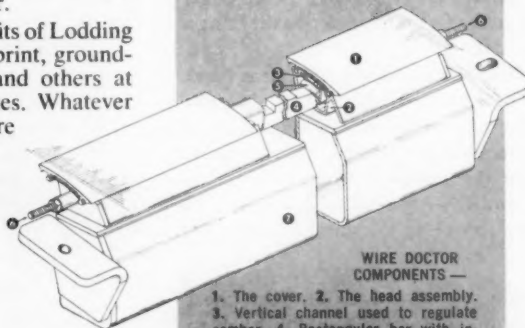
EXTREME OPERATING POSITION
MAXIMUM COVER CAMBER



TYPICAL OPERATING POSITION
MODERATE COVER CAMBER



CAM MECHANISM RETRACTED
COVER CHANGING POSITION



WIRE DOCTOR
COMPONENTS —

1. The cover. 2. The head assembly.
3. Vertical channel used to regulate camber. 4. Rectangular bar with inclined milled surfaces. 5. Flattened pin used to regulate the vertical movement of the channel. 6. Studs to regulate the horizontal movement of the bar. 7. The support beam.



You can see the fine hand of P & S in every new production Waterbury felt

One reason so many felts are rolling out of the Waterbury mill in Skaneateles Falls, N. Y. is that papermakers are discovering how much Porritts & Spencer technology has added to Waterbury's traditional quality.

P & S, you see, is the largest producer of papermakers' felts in the world, with 153 years of experience in designing and making felts for every climate and every type of mill.

Already, *new production* Waterbury felts have broken records for length of service, as well as contributing to easier starts and improved finish.

If you would like to know how they can benefit you, please write or phone us.



THE WATERBURY FELT CO., INC. Skaneateles Falls, N.Y.

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Magnefite boosts yield

Wausau achieves 40% increase, without any major expenditures for new facilities

Process also permits greater use of cheaper hardwood; produces better pulp

By W. W. KRUEGER, Process Engineer, Wausau Paper Mills Co.

Brokaw, Wis. OVER TWO AND ONE-HALF YEARS of continuous magnesium bisulfite pulping has proven to Wausau Paper Mills Co. that Magnefite pulps are more economical to produce than ammonia- or calcium-base acid sulfites. The economies of Magnefite are achieved by a three-fold operational advantage over conventional pulping methods. Advantages are:

- A production increase of 40% without any major expenditure for production facilities.
- Increased utilization of local hardwood species at half the cost per cord of Canadian woods.
- Better quality pulps, which result in more economical substitutions of sulfite pulps in paper machine furnishes.

The combination of the three easily offsets the higher chemical costs of the Magnefite process, and with the assurance that the process will eliminate stream pollution, Magnefite seems to be one of the more promising sulfite pulping operations to date. (See Table I.)

An ammonia-base acid system was adapted to Magnefite at Wausau. Prior to January 1959, Wausau's pulp mill had operated on ammonia-base cooking acid, which had been adopted in 1951 because of numerous advantages over the old Stebbens calcium-base acid system. The preparation of magnesium bisulfite acid solutions was dependent on the successful adaption of the existing ammonia absorption

tower to magnesium-base operation and strict pH control of the acid make-up in all phases of the operation.

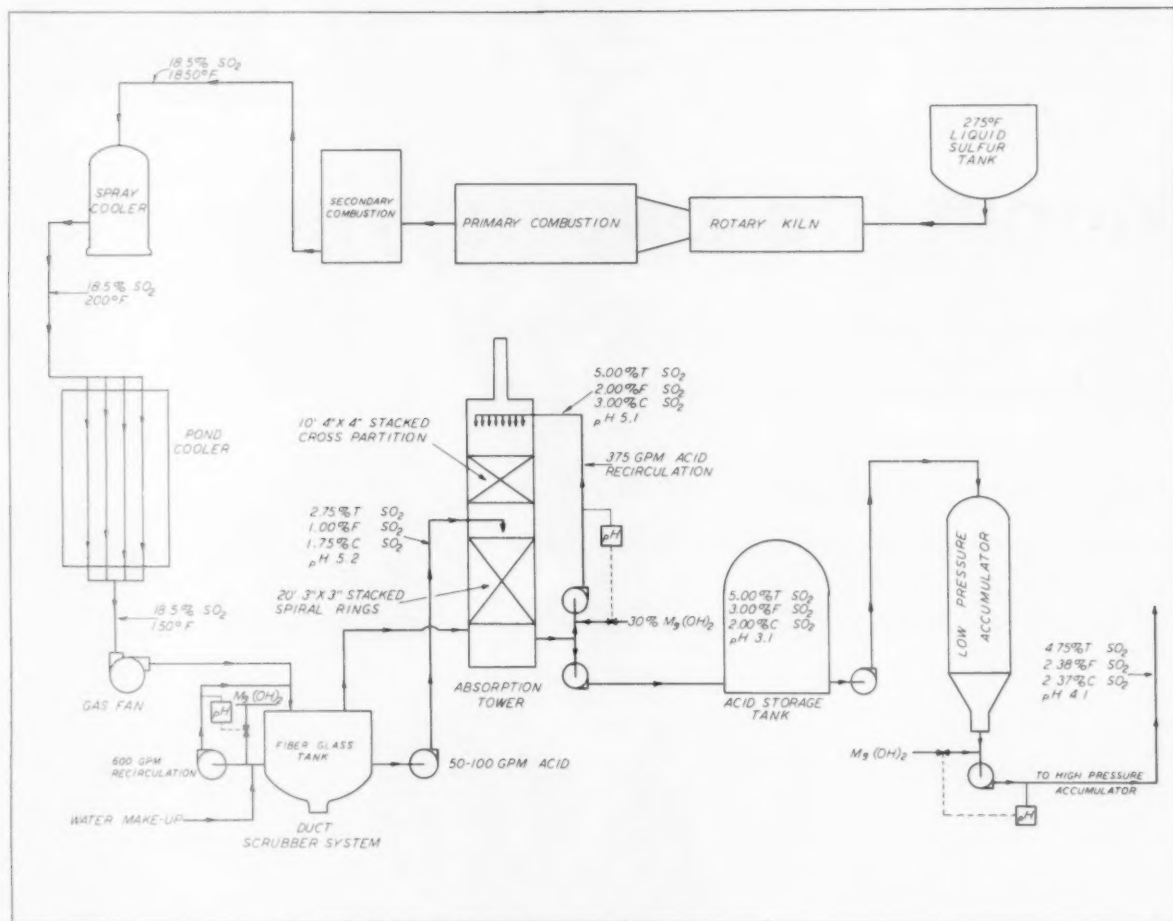
Utilization of the existing ammonia-base acid tower, which consists of a steel shell lined with acid-resistant brick, six feet in inside diameter and forty-five feet high, was dependent on providing increased absorption capacity and finding a suitable packing to handle the insoluble base, magnesium hydroxide. At the time of changeover, the tower was packed in two sections. The lower packing consisted of 20 ft. of stacked spiral rings, 3 in. by 3 in., while the top section contained 10 ft. of dumped Raschig rings, 2 in. by 2 in. The absorptive capacity of this packing was considered sufficient to handle the increased volume of sulfur dioxide gas required for the bisulfite operation, provided the acid recirculation on the tower system could be increased from 150 gpm to 400 gpm.

Receipt and successful unloading of the first car of 60% magnesium hydroxide slurry in January 1959 signalled the start of the still continuing trial period. The magnesium hydroxide slurry, diluted to 30% for storage and handling, was added to the acid tower recirculation line with a pH controller regulating the addition. After several months of successful operation, trouble developed due to a slow accumulation of magnesium hydroxide and magnesium monosulfite solids in the small two-inch Raschig ring packing. This plugging caused



PACKED ABSORPTION TOWER where SO_2 gas stream is stripped during the Magnefite operation.

Wausau Paper Mills Co.'s acid make-up system



the tower pressure to rise, severely limiting the sulfur burning capacity of the system. This, coupled with liquid channeling, limited the strength of the acid that could be produced.

Faced with the possibility of discontinuing the Magnefite operation, Wausau conducted a survey to determine what type of packing could be used to eliminate the plugging problem. The survey indicated that stacked cross partition rings, 4 in. by 4 in., in the upper section of the tower would eliminate the problem. However, these rings were known to have considerably less surface area than the Raschig rings and that, therefore, they would reduce the absorptive capacity of the tower. This was undesirable. To reduce the amount of absorption necessary in the tower, Babcock & Wilcox Co. designed a duct scrubber system, which was installed ahead of the tower at the same time that the top section of the tower was repacked with the cross partition rings. This arrangement proved to be

very satisfactory in eliminating the plugging problem and in producing acid of sufficient strength.

Operation of the present acid system is essentially a two-step procedure. A gas stream containing 18.5% sulfur dioxide at 150°F. enters the duct scrubber through a 14-in. orifice in the 18-in. fiber glass inlet line. Six-hundred gallons per minute of acid, magnesium hydroxide slurry on pH control, and make-up water are sprayed through the orifice, with absorption of some of the SO_2 taking place. Liquid-vapor separation in the fiber glass tank under the orifice produces an acid of 2.75% total SO_2 , at a pH of 5.1 to 5.2. This acid is then transferred to the center section of the tower while the residual SO_2 gas enters the bottom of the tower. To complete the SO_2 absorption, 375 gpm of tower acid and magnesium hydroxide slurry, again on pH control, are sprayed on the top section of the tower packing. Acid, at a pH level of 3.0 to 3.2 and containing 4.75 to 5.00% total SO_2 is transferred to a

brick-lined storage tank for use in the accumulator system. (See diagram at top of page.)

The hot acid pulping system at Wausau Paper Mills consists of three digesters of a total capacity of 12,000 cu. ft., one low pressure accumulator of 7,000 gal. capacity and one high pressure accumulator of 75,000 gal. capacity. All vessels are constructed of mild steel with acid-resistant brick linings. Raw acid is transferred from the storage tank first to the small accumulator, then to the large accumulator and finally to the digester system, while side relief and top relief from the digester system travel in a counter-current direction. The raw acid pH is controlled at a level of 4.0 to 4.2 as it leaves the small accumulator by addition of 30% magnesium hydroxide slurry. The proximity of the final pH control of the cooking acid to the digester system is a measure employed to insure accurate and close control of the cooking pH.

Hardwoods now comprise 85% of all woods pulped by the Magnefite process at the Brokaw mill. Mechanically-packed digester charges consist primarily of aspen, although some white birch and mixed hardwood are pulped as they are available. Digester charges are sweetened with 10 to 12% long-fibered softwood, which may be either Canadian spruce or locally produced balsam, to insure trouble-free operation of the bleach washers and wet presses.

Cooking acid from the large accumulator, at a pH of 4.2 and a liquor-to-wood ratio of 5 to 1, is added to the digesters at a temperature of 100C. The cook is started without any impregnation technique; time to maximum temperature is the shortest that can be achieved with the amount of steam that is available to the digester system. This type of operation is an advantage of Magnefite, since the cooking acid at a pH of 4.2 contains no truly free SO_2 , and, therefore, there is no danger of burning the chips. Side relief for digester liquid level control is taken at 120C. After this point in the cook, automatic top relief is taken as necessary to maintain 90 lb./sq. in. pressure in the digester. Aspen cooking time is between four hours and forty-five minutes and five hours, while the denser hardwoods require fifteen to thirty minutes longer.

The 40% production increase from

90 unbleached tons/day on ammonia acid sulfite to 126 tons/day on magnesium bisulfite results from two advantages of using the magnesium bisulfite cooking solutions. First, the average cooking cycle is one hour shorter than it was in the previous ammonia cycle, which result in an average of eleven blows/day as compared to nine blows/day on ammonia cooking. Second, the Magnefite operation produces an easily bleached pulp when blowing the digester at a Tappi permanganate number of 16 to 17. This is some nine points higher than ammonia acid pulps and the higher value of the permanganate number is reflected in an unbleached pulp yield of 52% to 55% as compared with an unbleached yield of 47% to 48% with ammonia acid.

To date no significant acid breakdown due to thiosulfate formation has been experienced in the normal cooking pattern. The level of total SO_2 in the spent liquor is generally between 0.2% and 0.3%. And the digesters are blown, regardless of the permanganate number, if conditions are such that the total SO_2 in the spent liquor drops below 0.2%.

Superior pulp is produced in conventional three stage bleach. The unbleached Magnefite aspen pulp has a GE brightness of between 60 and 65 and is easily bleached to 88 GE brightness in three stages of chlo-

rine, caustic and calcium hypochlorite. Chlorine demand for the bisulfite pulp is approximately one-third more than for the ammonia acid sulfite, and this is due entirely to the higher unbleached permanganate number. Sodium hydroxide and calcium hypochlorite consumption are the same as with ammonium acid sulfite. General bleaching conditions, such as temperature, remained unchanged for the Magnefite operation.

Magnefite bleached pulps exhibit better mullen, fold and tear properties than acid sulfite pulps produced with ammonia as a base. (See Table II.) In addition the opacity remains at the same level, while the bulk is some 7% to 8% higher. These superior pulp qualities permit increased use of the less expensive hardwood pulps in the paper machine furnishes that are used to produce Wausau's line of fine writing papers.

One other advantage of Magnefite pulp is that the slower developing bisulfite allows paper machine personnel to develop the maximum strength properties of the bisulfite hardwood-kraft mixture more uniformly, with better handling of the stock slurry on the paper machine. Here again, the easier to handle, more economical Magnefite pulps offer advantages over ammonia acid pulps, which require higher percentages of the more expensive sulfite softwoods or kraft pulps for equal results.



ROUTINE ANALYSIS of magnesium-base acid is made by the acid plant operator. At right is the console from which the operation of the plant is controlled.



MAGNEFITE ACID PLANT is equipped with a variable speed drive on its gas fan and a Du Verre fiber glass gas transfer line from duct scrubber to absorption tower.

... Magnefite at Wausau

Considering the operational advantages and the fact that a recovery system is available, the Magnefite process appears quite favorable. The simple, economical and commercially proven recovery process would not only provide efficient recovery of the cooking chemicals, but more important would satisfy the increasing demands for stream pollution abatement. Wausau officials are at present seriously considering the installation of a recovery plant and preliminary engineering design work is already under way.



EJNAR GISSELMAN
Superintendent of Pulping



W. W. KRUEGER
Process Engineer

Table I

Comparison of Major Chemicals Used in
Magnesium Bisulfite and Ammonium
Acid Sulfite Pulping

	Magnefite Mg(OH) ₂	Ammonium Acid Sulfite NH ₃
Base Chemical (lbs/unbl. a.d. ton)	265	94
Sulphur (lbs/unbl. a.d. ton)	265	240
Chlorine (lbs/bl. a.d. ton)	150	105
Sodium Hydroxide (lbs/bl. a.d. ton)	50	48
Lime (lbs/bl. a.d. ton)	37	37

Table II

Bleached Pulp Comparison of Magnefite and
Ammonium Acid Sulfite Pulps

Species	Birch		Aspen	
	MgO	NH ₃	MgO	NH ₃
Cooking Base				
Beating Time to 500 C.S.F.* (min.)	17	16	145	9
Mullen Per Cent at 500cc.	98	84	86	54
Tear Factor at 500cc.	1.05	.66	1.06	.63
Schopper Fold at 500cc.**	690	175	300	40
Bulk cc/gm***	163	150	162	151
Opacity	76		79	79

*Canadian Standard Freeness

**Double Folds ÷ Basis Weight

***On Unbeaten Pulp

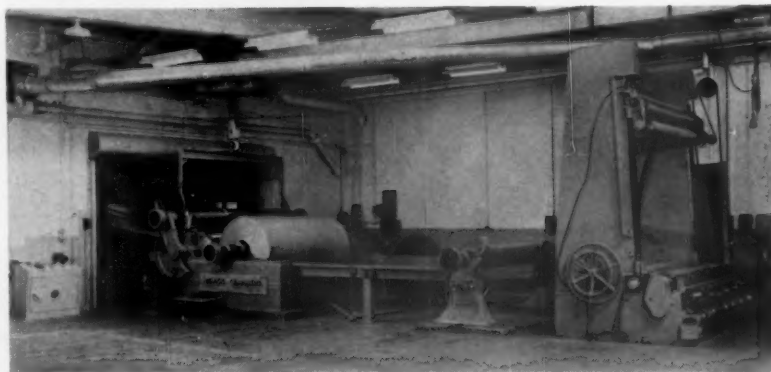
HOW TO DO IT

Problem: Installing a reel and winder in tight quarters

Problem: Fort Orange Paper Co., a subsidiary of KVP Sutherland Paper Co., had been making paperboard in cut sheets only, but customers began demanding paperboard in rolls. Space for a reel and winder was limited because there was only enough room at the end of the machine room to tend the existing cutter. And beyond the machine room wall was a warehouse with very low headroom and a side wall that angled in toward the center of the paper machine.

Place: Castleton-On-Hudson, N. Y.

Solution: A Black-Clawson Auto-Flyte 36 reel, and a Black-Clawson unwind stand with Horton brake followed by a Dilts Division TD-12 winder were ordered. By redesigning the Horton brake arrangement and the winder drive and by using transfer rails in place of a crane to handle the six-ton rolls of paper, plus a light two-ton hoist to carry the empty spools back, it was possible to overcome the low headroom difficulty and to get the



entire installation between the center of the machine and the back side wall. In operation, the web by-passes the existing cutter.

The fact that Fort Orange's customer had to have some of the rolls wound with the liner side out created the problem of turning the rolls around.

However, one of the roof beams

supporting the monorail came directly over the point where the rolls were to be turned. By installing a special low head hoist and keeping the clearances between the strong-back and the roll of paper to a minimum, it was possible just to clear the transfer rails when turning the roll.

The project was engineered by Black-Clawson's Paper Machine Div.

SUPERVISION METHODS

Touchy questions face companies in filling management positions

By LELAND A. KELSON, Resident Manager, Crown Zellerbach Corp., Lebanon, Ore.

MANAGEMENT POLICY concerning whether personnel placements are made from within or without the organization is a basic decision in every company. Those which fundamentally promote from within derive two general benefits. Continuity of supervision and management is sustained because selectees are already company-oriented. The morale of employees is likely to be enhanced because ability is being rewarded.

But some firms feel bringing in outsiders provides an invaluable means for introducing new approaches and outlooks. The proper training of employees for prospective job vacancies is too costly, they feel.

Although there may be merit in this "import" approach, it is apt to lead to a higher personnel turnover, which can be more costly than training insiders.

Some companies that promote from within do so on the basis of straight seniority. Lateral transfers between departments are made only occasionally and into positions near the bottom of the "seniority ladder." This may give hope to the qualified departmental specialist, but it tends to stifle incentive among younger employees.

In general, the industry's basic need is for men who can produce pulp and paper and convert them into saleable products. But it also must have men capable of managing the broader aspects of business. The man with technical background is valuable in all functional areas.

Production supervisors and managers historically have been men who have proven their ability a step at a time and have advanced accordingly—that is, fundamentally in a straight-line progression. Many men now holding key positions, who have reached them in that way, are adequately managing company affairs. The big problem with this system, however, is the unnecessary time that elapses before the initial promotion. Besides, the additional management skills that are required in the new post are more difficult to learn after years of routine, operational duties.

A young man with an advanced educational background is in an advantageous position. He, at least, has a cursory acquaintance with much of the information and skills a supervisor or manager needs. His technical background has equipped him to assimilate basic details of the operations. If, in addition to educational training, he has had some job experience in the industry, he has also acquired the feel of pulp and paper making, which is also necessary. Consequently, the technically trained person generally can be prepared for a supervisory position in a shorter time than can those not so equipped.

The technical man must indicate a desire to become an asset to the operating department. Frequently, young men make known their desires. Many of them do so by actively pursuing knowledge they will need to qualify them for higher opportunities. To effectively follow such a course, the individual must have taken account of himself and have decided just what are his aims and goals.

A new employee's chief concerns

are becoming familiar with his job—learning procedures, becoming acquainted with his fellow workmen and "keeping out of trouble." His aims and goals are inclined to be vague. Subsequently, he learns of other areas of the company and, in general, becomes familiar with their functions and their relationship to the whole.

If he decides to aim toward an operating department, he may soon become cognizant that he must begin at the bottom—and also that there are many ahead of him at the bottom.

The employee who recognizes this is fortunate. But programs usually have been established to help him along. Often an informal school is available for assisting interested employees in becoming more familiar with all phases of company operations. The technical man is in a good position to concentrate on areas of particular interest to him.

Valuable know-how can be obtained

in "formal training jobs" within operating departments. These positions, commonly known as "technical assistants to the superintendent," provide the best opportunity for continuous learning within a department. Here the technical man can contribute his skills to the operation and yet be relatively free to observe and learn many details necessary to know for effective first-line supervision.

If provision hasn't been made for formal training, the employee can gain much knowledge of departmental operations by devoting some of his own time to observing those operations.

Selecting an individual for a position is a decision of long-range effect on both man and company.

An axiom of personnel selection has been: "The departmental supervisor should select those who are to work for him." But in the past, the point was reached at which the supervisor hired whomever he pleased and on whatever basis he chose. He also fired as easily.

It was—and still is—important that the supervisor and his employees work together effectively. Furthermore, the supervisor remains responsible for the actions of his workmen and, therefore, must, at least, approve those who are hired.

But with today's emphasis on semi-scientific personnel placement, much of the initial selection and testing for suitability is conducted by specialists. Top management also has taken greater interest in selection.

Superintendents, managers and vice presidents

are expected to emerge from among the first-line supervisors. Consequently, final approval of initial supervisory promotions in many companies, is the prerogative of the resident manager or his superior. Even so, a departmental supervisor usually retains the right to reject a man as a member of his department where obvious conflicts might develop.

Refiner Groundwood vs.

Each has its "day" at fourth International Mechanical Pulping Conference . . .

By ALBERT W. WILSON, Editor, PULP & PAPER

—Chicago
IT HAS BEEN 121 YEARS since F. G. Keller made the first groundwood with a primitive stone in Europe and four years later his feat was duplicated by Charles Fenerty across the ocean at Halifax, Nova Scotia.

In all those years changes in the classic process have been so slight that this segment of the industry has been considered relatively static. Technical papers or developments have been few and far between.

Suddenly, today, there is a wealth of new ideas and information which could quickly revolutionize the manufacture of groundwood.

Major new developments were reported at the 4th International Mechanical Pulping Conference, held in late September at Chicago under joint auspices of the TAPPI and Canadian industry's Technical Section.

Groundwood always has been considered the great conservator of our forests. But, technically, it is a field that most of the industry looks down its nose at.

Tremendous advances have been achieved in Pacific Coast mills in making quality groundwood from chips with disc refiners. They include the mills of Publishers Paper Co. at Oregon City (PULP & PAPER, Sept. 18, 1961, p. 62), Crown Zellerbach at West Linn, Diamond National at Red Bluff, Calif., and MacMillan, Bloedel and Powell River, Ltd., in Canada.

But the stone-made groundwood advocates aren't quitting. The sensational rotational grinder for whole logs, developed in Italy by Ing. Piero Bersano, is now successfully producing a quality pulp, and many early problems have been solved. From Bowater's new groundwood mill on the Mersey River, England, and the pitless groundwood mill of Risoer, Norway, also comes new information.

A steel wheel used in the Pulp and Paper Research Institute of Canada is revealing new information.

The meeting was one of the most truly international in character that has been held in North America this year, with about 110 of the 280 delegates from outside the U.S. Ground-

wood-newsprint-minded Canada sent more than 80 persons, and from the Scandinavian nations came 16 delegates. West Germany, Holland, England, Ireland, Belgium, Italy, South Africa and Chile were represented.

General chairman was W. H. de Montmorency, of the Pulp & Paper Research Institute of Canada, and program chairman was S. R. Parsons, of Consolidated Water Power & Paper Co., Wisconsin Rapids, Wisc.

A less controversial keynote address than had been the rule in previous triennial international sessions of the groundwood clans proved misleading as fiery debates were only minutes away. Lowell Besley, chairman, woodlands research dept., Pulp & Paper Research Institute of Canada, kicked off the affair with the contention that it's high time foresters and technical pulp and paper makers talked a language that is comprehen-

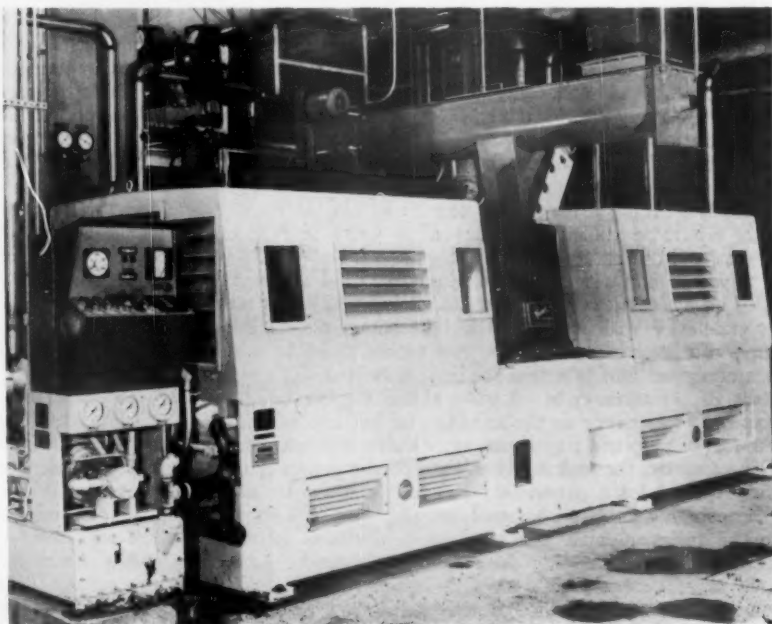
sible to both parties.

Foresters need specific measurements of what is good and bad in a tree, he said.

He also discussed possibilities of controlling moisture in wood, explaining that it varies more in fresh cut wood than in partly seasoned. Re-moisturing of wood may bring back qualities that the paper mills want.

"The woods operator and the mill superintendent should take a close look at pulpwood, together, and set up wood specifications with minimum and maximum values of desirable and undesirable properties, as well as their optimum averages in the mixture," Mr. Besley said. "Some immediate improvement is possible through selection of stands and of trees to log for pulpwood. Longer range forestry measures can provide for more valuable crops in the future."

Mills should interpret their operating experiences and results in terms



DOUBLE-DISC REFINER, which makes groundwood from mill residue, is being used by several mills on West Coast where such material is plentiful.

Stone Groundwood

... Pacific Coast mills adopt refiner;
stone producers claim major advance

of recognizable wood characteristics, thereby starting quality control in the woods, he said. Some of Mr. Besley's ideas: thinning will control ring widths, wider spacing of trees will increase low density "springwood," irrigation will increase "summerwood," trees can be grown with more "bright" wood or with little or no heartwood, when this part of the tree is undesirable. He suggested in extreme cases it might be worth while to rush cut trees by helicopter at \$50 per cord increased cost to a mill to retain brightness and moisture—or by truck, instead of river drive, at \$5 more per cord.

Use of a steel wheel
instead of the traditional stone in experimental work at the Pulp & Paper Research Institute of Canada was the subject of a film presentation by Dr. Douglas D. Attack, of the Institute, which was one of the real highlights

of the meeting.

The steel wheel or cylinder was not presented as a possible substitute for the stone, but only as a highly useful experimental tool. Some delegates, however, speculated as to whether a steel wheel could substitute for stone—be controlled or adjusted in some way, as in the burring of stone—and whether its high replacement cost could be overcome.

Dr. Attack's steel wheel slow motion films indicated that grinding cannot be made any more efficient energy-wise under present conditions and that stone manufacturers and groundwood producers have achieved a limit of their potentials. But in the high speed regions, there can be great changes.

Most exciting new information revealed by the steel wheel, in the eyes of many in attendance, was that more charring takes place just below the surface of the wood as it meets the

grinder than at the actual surface.

The information Dr. Attack withheld, however, may be much more important than what he revealed in Chicago. Further information will be presented at the annual Canadian meeting next January at Montreal.

Production and dissipation
of frictional heat in the groundwood process stirred up a flurry. Dr. Borje Steenberg, head of the Swedish Forest Products Research Laboratory at Stockholm, told how drilling of holes through sticks used in grinding made possible the sampling of pulp for temperature, consistency and freeness. The measuring was done just above the grinding zone.

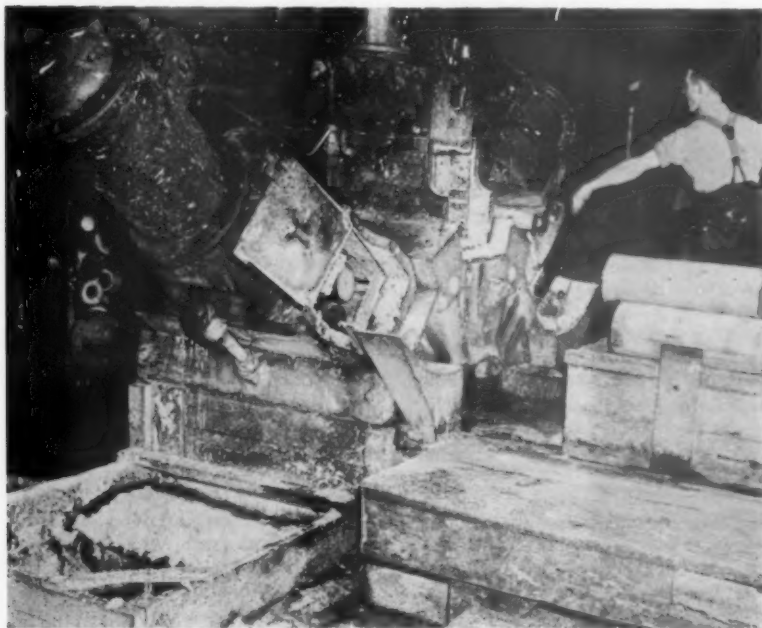
Dr. Steenberg questioned aspects of a theory presented by Dr. G. E. R. Lamb, of the State University of New York, Syracuse, N.Y., who contended that energy used in production of groundwood could be reduced—from one-half to as much as one-tenth of present consumption—by varying decompression and compression in grinding. A lively discussion was touched off by this paper.

Dr. Lamb compared mechanical pulping to peeling adhesive tape.

Printability of groundwood
was the theme of a presentation by Otto Brauns, technical director of the Swedish Paper Mills Assn. Mr. Brauns reported that he had accumulated favorable data on the optical properties and printing qualities of groundwood pulps from 27 mills. Predictive printing quality tests were performed on handmade sheets.

Economics of grinding with varying types of equipment produced in North America and Europe was the subject of a statistics crammed paper by Prof.-Dr.-Ing. Walter Brecht of the Institute of Paper Technology, Darmstadt Institute, Germany, and his son-in-law, Dr. F. O. B. Luhde, of Anglo-Paper Products, Ltd., Quebec City. The paper was based on replies to a questionnaire from 38 North American and European mills.

European chain grinders (by J. M. Voith of Germany) were reported to



STONE GRINDER, standard device for making conventional groundwood, reportedly has undergone some important changes in England and Norway.

**These key men
were among the 280 delegates
who attended
the Chicago confab**



Ing. Piero Bersano, Lowell Besley, P&P Research Inst., Canada
... Success reported on rotational grinder



Joe Swartz, Bowaters Southern Corp., Tenn. Otto Brauns, Swedish Paper Mills Assn.
... Surprises on groundwood printability



Prof. Borje Steenberg, Swedish F. P. Research Roderick O'Donoghue, Consulting Engineer
... What happens between stone and wood



Dr. Doug Atack, Pulp and Paper Research Institute of Canada
... Steel wheel reveals new information

run at higher loads per square feet of grinding area than the typical North American two-pocket grinders. The stock produced by the Voiths for newsprint, the report said, is more free, but the average power used per ton is lower than in North America. Maintenance, man-hour and building costs were lower in Europe, but capital costs of North American two-pocket grinders were lower than those of ring or chain grinders.

Waterous Great Northern and Waterous hydraulic magazine grinders, and the Great Northern, made by Montague Machine Co., were the two-pocket grinders surveyed. The inquiry revealed that Great Northern grinders behave differently with Eastern spruce and balsam than with Western hemlock.

Besides Voith chain or ring grinders, various North American continuous, or chain grinders, made by Ch. Walmsley of Canada, or Dominion Engineering with Koehring-Waterous, were studied.

In the average European mill reporting there were only six grinders as against 16 in the average North American mill, making possible more economy in labor forces in the larger mills. With fewer stones, quality checking must be done more carefully, also, the authors said.

Total labor required per ton in North America is fairly low, except for ring and multipocket grinders (but two thirds of Canadian and more than half of U.S. production are made by

two-pocket grinders and also the remaining third in Canada by chain grinders). In Europe labor per ton is higher, the authors said, because more attention is paid to controlling and supervising.

Building requirements per ton are generally greater for high magazine types because of the need of an elevated charging floor. The Voith V and Voith VI grinders were described as exceptions to this rule because of their enormous capacities.

The disc refining "cult" had its "innings" on the second day at Chicago, and as expected, much enthusiasm and interest in the "new" groundwood were generated.

Dr. Walter F. Holzer, manager of technical projects, Crown Zellerbach Corp., San Francisco, led off with a report on the disc-refiner groundwood being made at the C-Z mill at West Linn, Ore., with a Bauer No. 480, driven by 2,000 hp. This is followed by pump-through refiners; there is no chemical treatment. The groundwood is newsprint grade. This unit is a 48-in. double disc refiner which was started up in June.

West Linn will have two stages and Dr. Holzer said a stronger groundwood than stone is being made.

A major point emphasized by Dr. Holzer is that the disc refiner groundwood process opens up a new field for use of forests and mill residues for groundwood. This point has been stressed by James A. Wilson, vice president and manager, Publishers

Paper Co., which has a 1,500-1,500 hp. Bauer No. 480 making similar groundwood pulp at Oregon City, across the river from West Linn.

At West Linn, hemlock is the species mostly found in the disc-refined wood residues. This unit is still considered in between experimental and commercial status, since it has not displaced any grinders, although it is used commercially.

Pilot work was done at Crown's Central Research in Camas with a 40-in. double disc 800-hp refiner. Under optimum conditions, stronger pulp is made by this process than by the regular news-groundwood process.

In the West Linn semi-commercial installation, the pump-through-refining was added to touch up the groundwood and study pump-through results. Stock passes to a Jonsson knottor screen and then to rotary screens. With pump-through, less operating control was required and plate life improved considerably. Better pulps have been made using 250 Brinnell plates rather than harder alloys.

The pump-through refiner, added two months after the double disc operation, brought: (1) a reduction in over-all power requirements per ton. (2) greater through-put; (3) reduction in tearing strength; (4) better double disc operation because of increased through-put. The knotters are necessary when whole chips come through at startup or shutdown, and to protect cleaning systems from plug-



Joe Shouvin, President, Bauer Bros. Bill Heustis, Continental Can Co.

... Refiners opening up new frontiers



James H. Perry, Norton Co. Dr. Walter F. Holzer, Crown Zellerbach

... Disc refiner opens up forest residues



Don Chisholm, Norton Co. of Canada Joseph Pyle, Bowaters Sittingbourne, Eng.

... Optimum grinding achieved at Marsey

ups due to oversize material.

Two-stage high density refined pulp is 15 to 20% stronger than single stage and stronger than normal stone groundwood at the same freeness level. Other requisites of good refiner groundwood are first stage refining power at 30 to 50% of total power, and absolutely uniform metering of chip feed.

Dr. Holzer said use of refiner groundwood as a substitute for stone groundwood has not been fully evaluated, but in some trials gives a stronger sheet, and indicates improved machine formation and higher bulk for printing.

Collaborating with Dr. Holzer in this report were John T. Henderson and William B. West, of Camas Central Research, and Ken Byington, pulping section leader, West Linn.

Softwood and hardwood groundwood chips made with a laboratory 24-in. double disc refiner at Abitibi Power & Paper Co.'s Central Research Division in Sault Ste. Marie, Ont., was reported by Dr. J. W. McKinney, assistant research director. Dr. R. M. Dorland, director, and D. A. Holder and R. A. Leask were co-authors.

Pulps of greater strength than news groundwood were made from untreated spruce chips, while steaming of chips gave higher strength, and dipping steamed chips in sodium sulfite resulted in further strength increase, with increased brightness and lower power.

Steamed aspen chips gave a refiner groundwood that is better than standard news groundwood, and spruce mixed with aspen gave good results, but jackpine was lower in strength.

Dr. McKinney said refiner groundwood showed less fine debris, more long fibers and fewer bundles than standard groundwood.

Mechanical advantages of using chips instead of logs are substantial, he said, and he predicted "a bright future" for refiner groundwood.

Cold caustic pulp from single stage refining was the

subject of a paper by J. Beaujean and V. B. Bodenheimer, of Continental Can Co.'s new mill at Augusta, Ga. The cold caustic plant serves a 350-ton bleached board mill, using hardwoods and aiming at high quality, shive-free pulps made at less than one-tenth the cost of a bleached kraft pulp mill.

The quality has been "good to poor" but will be improved by modifications and more careful wood selection. About three-fourths of the pulp is excellent and the rest has predominantly small shivey material now removed in cleaners. As much as 15 tons of rejects per day in primary cleaners, with lesser amounts in secondary and tertiary ones, were reported.

The plant gets 60 brightness economically, and freenesses are maintained at 350 to 500 Canadian standard. Refiner horsepower has been about 30 hp-days per ton. Bleaching chemicals average 1.25% peroxide. Sometimes sulfuric acid is added for proper pH. Maintenance is low, and one man operates the plant.

A refiner groundwood panel discussion was led off by Don Stewart, MacMillan, Bloedel & Powell River, Ltd., of Nanaimo, B.C., Canada, describing his company's two Bauer No. 411's used in series, as research units. He said the refiner groundwood produced a pulp higher in burst and tear than stone-made groundwood. On a trial newsprint run, he reported, a freeness down to standard newsprint quality was achieved.

James E. Foote, of Diamond National Corp., described the use of four primary and three secondary Bauer 411 disc refiners in making a fairly free groundwood from chips at his company's Red Bluff (Calif.) mill. There is a pre-treatment of the chips with sodium sulfite to give extra strength and brightness. This is a moulding pulp for special moulded pulp products.

Ponderosa and sugar pine chips are mixed to make about 50% of the pulp supply. Refined separately are white fir chips for about 30% and Douglas fir for less quantity.

O. K. J. Sepall, of Anglo Paper Products Ltd., told about the new type of chipper developed at the Quebec City mill (PULP & PAPER, Dec. 1960). The knives are operated as in veneer production, on a "reverse lathe." This gives positive control of thickness and length of chips and eliminates "battering."

Joseph N. Swartz, of Bowaters Southern Paper Corp., gave a general report on qualities of groundwood pulps from straight mechanical down through slight chemical, cold caustic, and 65% neutral sulfite. He dealt with yields, characteristics and uses.

R. L. Johnson, of Waldorf Paper Products Co., St. Paul, Minn., described his company's cold soda-hardwoods plant where two stages of Bauer 411's are used. The pulp is bleached for foodboard.

Dr. L. R. Thiesmeyer, head of the Pulp & Paper Research Institute of Canada, participating in discussion of groundwood-from-chips, said his dream was a water pipeline to carry chips from the woods to the mill. He told PULP & PAPER that a ten-mile laboratory run of chips has been made in a half-mile pipeline.

Discussions brought out views that chip refining for groundwood fits in with modern materials handling concepts, quality control and process control developments. Groundwood men said a refiner problem will be how to prevent the chop formation and how to reduce energy consumption, while maintaining high strength.

Screening tests of groundwood have been made in a groundwood pilot plant at Darmstadt, Germany, reported Dr. Brecht and his former assistant, Arno Weidhaas, who is now in research work at Weyerhaeuser Co.'s Longview (Wash.) mill.

It is more difficult to obtain quality, they found, when groundwood has more splinters and long fibers and less fines. Tearing or folding endurance diminishes as long fiber content is cut as a result of the reduction of splinters.

Separating effect of a screen at a given stock weight retention improves

Refiner or stone groundwood

as the fineness of the accepted stock and the coarseness of the retained stock leaving the screen increase. Relative retention of splinters and relative acceptance of long fibers take opposite directions. Determination of the most favorable operating condition of all types of screens requires a compromise, and extensive separation of splinters without a considerable loss of good stock requires a screening operation with several stages.

The stone-groundwood faction had its day, too, at Chicago.

Chris Anker, of Risoer Tremassefabriker, in Risoer, Norway, discussed the use of pit-less grinders at his mill. He said Risoer is getting better pulp and better power usage. Without pits, they get less pulp back to be re-ground on the stone. With pit-less grinders it is easier to keep the trough under the stone clear, and the danger of burning is reduced.

A new Bowaters groundwood mill (Mersey), England, was described by G. F. Underhay, research director of the British firm, and G. W. Thompson of Bowaters Research.

Four Voith chain grinders are used, each with 4,000 hp. They grind spruce and other native British wood, freshly cut and unbarked.

The grinders were operated with pit and pit-less conditions and with varying power usage and other changing conditions. In the flexible Mersey plant, motors were coupled to stones through gear boxes to allow changes to be made in peripheral speeds.

The plant has been producing consistently 67 tpd of good quality newsprint groundwood per grinder, equivalent to 31 short tons per 1,000 sq. in. of pocket grinding surface each 24 hours. The rate is considerably above average. The author said this was due to adequate power (4,000 hp per stone), high peripheral stone speeds (5,500 fpm.) and good shower pressures.

In the groundwood process, the authors said, consistency control, temperature control (by spray water, pit temperature, etc.) and even the question of pitlessness or immersion in pit stock are not in themselves such essential factors in production and quality as they are sometimes thought to be. They contend that the grinding picture has been clouded by failure to recognize sufficiently such essential variables as peripheral stone speed, grinding area, horsepower to stone and grinding area, average running load, production per stone, or

per thousand square inches, h.p. relation to tons, burst factor, fineness.

James Griffin, of Great Northern Paper Co., R. Murley, of Bowaters Newfoundland; Harry P. Richards, of Ontario Paper; James H. Perry, of Norton Co., and Robert W. Hawkes of Montague Machine Co., were also panel speakers, with L. K. Kirkpatrick, of Bowaters Southern, as moderator.

Progress of the Bersano grinder was a highlight of the stone-groundwood day. This is the rotational-type log grinder developed by Ing. Piero Bersano, technical director and production manager of Cartiere Burgo, largest Italian pulp and paper company, with several mills in northern Italy, and one of the largest in Europe.

Norton International, Inc., is associated in this project and has filed patents throughout the world.

Dr. Bersano's report indicated high quality pulp can be achieved with his rotational grinder, and much progress has been made in the past three years. The principle is a wide angle abrasive cone wheel and two rolls into which a log is drawn while rotating. Multiple stations were required to completely reduce the log to pulp. A number of units were built by Burgo, some with modified hydraulic pressure. At each station about $\frac{1}{8}$ in. of the log diameter was removed as pulp and the log progressed at 12 to 14 ft. per minute.

Early pulp was coarse and shivy. To improve quality, rigid mounting, stronger thrust bearings for momentary overloading, and connecting the wheel directly to the motor were steps taken. When a driven roller was erroneously connected in reverse, it was found that much more regular grinding resulted, especially after the roller was made of abrasive. Thus, an error led to an improvement.

A helper drive for log rotation and improved grinder wheel setting were further steps. Power consumption was reduced and top quality pulp was made from spruce at 30 to 35 hp. days/ton. Ing. Bersano said eliminating machine stresses not essential to quality will lower these figures.

An eight-station commercial grinder was built with: (a) 14-in. grinding wheels with a corrected profile in respect to conical face; (b) a single driven conical shaped roller for each of four stations, (permitting decreasing peripheral speed as log diameter decreases); and (c) a second set of rollers, which are idling, also of decreasing diameters, nec-

essary completely to grind the log.

The machine had 20 hp. on four stations and 10 hp. on four, with horizontal shafter rolls in front of which was an open single driven roll and series of bottom idler rolls. Discharge of pulp from the lowest part and free flow was interfered with by bearings on idler rolls. The machine was rebuilt using part of the wheels for grinding and placing the driven roll on the bottom. A six-inch log maximum is reduced to $\frac{1}{8}$ inch, and four tons of pulp a day are produced. More stations can adopt any size log and the log can be completely reduced to pulp, he added.

Each 14-inch wheel removed $\frac{1}{8}$ inch of the log diameter with the new machine. Work done by eight such stations, he said, can be done by three stations with 40-in. wheels. Many crooked logs can be taken and big wheels will permit use of logs with knots and parts of branches. "Ability of our grinder to separate pulp from outside rings and heartwood opens up new fields of forest exploitation," said Ing. Bersano.

Soft-bulky to strong-hydrated pulps are made, all easily bleached, because compression and depression opens the pores and washes fiber countless times. "We believe at high consistency we have a better pulp," he said. He predicted Burgo soon would build a commercial machine, of reasonable length, useable on all kinds of logs, and producing high yield semi-chemical as well as mechanical pulp. The operation was described as "low cost."

Power savings would be 20% compared to conventional methods, he predicted. Length of logs is unimportant and means fiber savings, and automatic feeding reduces labor costs.

Continuous high density bleaching of groundwood was a presentation by A. D. Armstrong, D. M. Furguson and R. P. Hamilton, all of St. Regis' Deferiet (N.Y.) mill, in conjunction with R. J. Rosebush and P. O. Jordan, of FMC Corp.

Basically, St. Regis is bleaching groundwood pulps at a high density of about 25% to brightness of 75 and higher using about 1% hydrogen peroxide in a 50% solution. A complete report on this process will be featured soon in PULP & PAPER.

Final event of the Chicago meeting was a panel discussion on the ideal layout for a groundwood mill. E. P. Walsh, of Anglo-Canadian, was moderator, with L. Gagnon, of John Breakley, Ltd.; H. M. Hughson, of Consolidated Water Power & Paper; C. R. Powell, of E. B. Eddy Co.; S. Shinkle, of Publishers Paper Co. of Oregon; and R. T. Wetmore, of Ontario Paper, as participants. ■

New digital draw-speed indicator slashes machine set-up time

speeds correction of in-process variations



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Photo shows draw-speed indicator installed at the Pensacola, Florida plant of the St. Regis Paper Company.

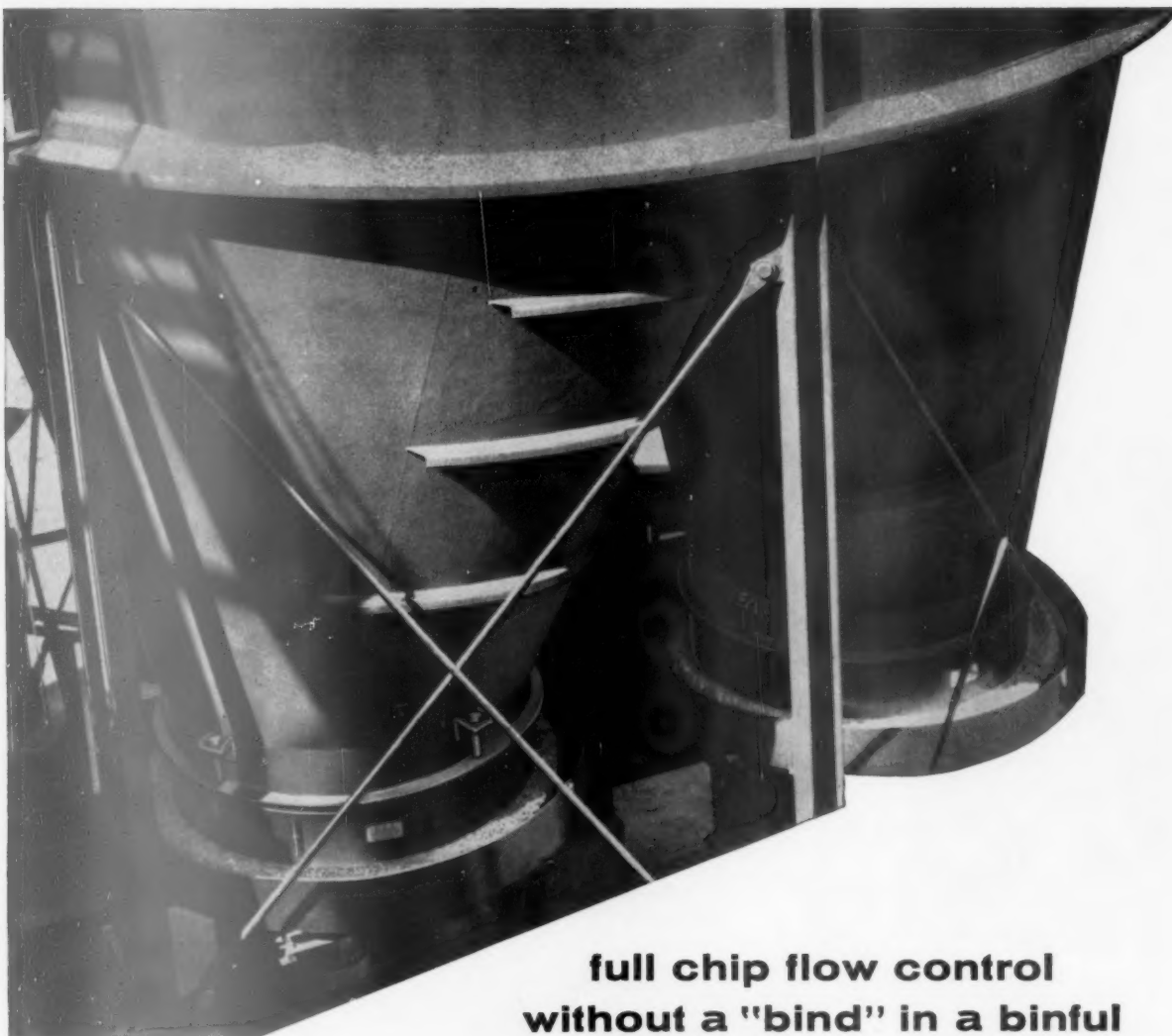
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16

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Chip piles grow higher in South as roundwood handling declines



NEW AND OLD: Outside chip storage (left) is yielding cost advantages over roundwood storage (right). The system, initiated in the West, now is used in several Southern mills, and is being studied by others there.

THE OUTSIDE CHIP PILE, once considered impractical in the South, is becoming less an experiment and more a real solution to the inefficiencies of roundwood storage.

Although no figures are available that would show percentage of chips consumed yearly from outside storage piles, industry estimates of chip percentage of total wood volume in 1960 do show a 21% increase over 1959. Last year, 2,877,300 cords were purchased in chip form in the South, representing 12% of a total pulpwood production there of 20,595,500 cords.

Furthermore, pulpwood bought in chip form has increased 100% throughout the U. S. in the past five years, reaching 7,000,000 cords in 1960. Rate of growth of purchased chips since 1956 is 13.6%; roundwood, on the other hand, has a comparative growth rate of only 4.1%.

Several mills recently have converted to outside chip storage. In the Northeast, Scott Paper Co., Winslow, Me., and Howard Smith Paper Mills, Ltd., Cornwall, Ont., use the system.

In the West, where chips have been stored outside for many years, St. Regis' newly expanded mill at Tacoma, Wash., and Menasha Wooden Ware Corp.'s new mill at North Bend, Ore. have outside chip storage. And Southwest Forest Industries, Inc. will store chips outdoors at its Snowflake (Ariz.) mill, scheduled for start-up late next month.

A logical assumption based on the current progress that is being reported in the South is that outside chip storage (OCS) is challenging roundwood as the predominant pulpwood storage system there.

Primary reasons for the switch to OCS are the demonstrated economies over roundwood storage. To cite an example, one Southern mill was able to handle chips with a blade dozer in about half the time it took to unload and store 5-foot pine bolts with a crane.

Mill management says cost-shaving OCS:

- Provides more reliable wood

measurement in storage because awkward-shaped logs are difficult to survey.

- Results in lower transportation costs, if wood is chipped at the logging site.
- Takes up less woodyard space.
- Permits greater hardwood utilization, since different woods can be stored in chip form in closer proximity than can species in roundwood.
- Allows, in general, complete wood utilization, including greater use of bark.

Greater wood utilization is probably the chief benefit of OCS. Public demand for more and varied wood products, indeed, the diversified uses to which mills are putting wood, call for use of much more of the tree than was the case a few years ago. With OCS, bark is saved and turned into useful products, not given a chance to rot from a log in storage. With OCS, pine and hemlock, for example, are in close inventory, not miles apart, a fact in many roundwood yards.

Chip recovery is an economical, fast operation

But chip vs. roundwood handling still is subject to old controversies. Research still is being conducted to determine the effects on pulp quality of pile mold, heat reactions on the interior of the pile, excessive air moisture, air pollution and other factors. (PULP & PAPER, Oct., 1960, p. 111.)

All important in paper manufacture today is quality of the finished product. Magazine publishers, particularly, are demanding greater evenness, whiteness, strength and opacity in coated papers. Tests at one West Coast mill on OCS pulp of a dark yellow color, showed no loss in quality after the discoloration was bleached. Other tests showed less foam reaction with OCS pulp than with pulp of roundwood stored for the same time.

But more facts are known about the behavior of roundwood in storage—facts which have influenced mill management to give OCS an appraisal.

Losses of up to 25% have been recorded in tear and mullen qualities of roundwood stored for six months. Density and yield qualities of this wood decreased as much as 7% in storage. Moreover, the amount of bark that is lost from roundwood in storage is considerable.

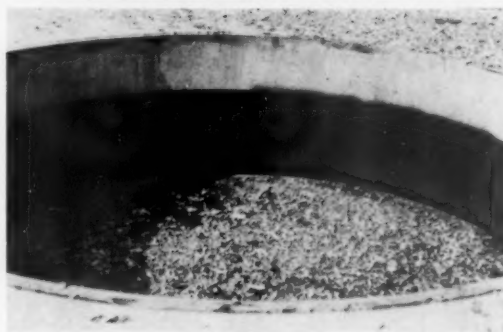
Efforts to cut down storage-yard losses of this nature have been only partially successful—and very costly. Underwater storage, undertaken largely to combat insect deterioration in the surface yard, requires huge initial investment and costly maintenance, which some mill management says doesn't pay.

Equipping an outside chip yard is expensive, too. But lightweight chips are more easily handled than water-logged wood, helping to offset the initial cost, says the OCS school.

Recent progress reports on OCS, published by the American Pulpwood Assn., describe some of the cost and production advantages in OCS.

A big vote of confidence was given OCS by Crown Zellerbach Corp., when it replaced its entire roundwood supply with purchased chips at Bogalusa, La., while other mills are changing over slowly. The company made the move in expectation of greater handling efficiencies, less wood deterioration, more uniform supply of chips to digestors, and, better pulpwood handling.

Wood discarded a few years ago as "sawmill waste" now is utilized in



CHIP RECOVERY is done speedily with this "bevel-edge" blade dozer, which pushes about 4½ tons of chips toward a reclaiming basin. Two kinds of basins are shown: the pitched-side, drag-chain type (above) and the revolving plate-

pulp production at Bogalusa and other mills employing OCS.

After seven weeks of use, the pine chip pile at CZ had grown to 13,000 units. (A unit is equivalent to approximately 4,600 lbs. of green pine chips.) Plans ultimately call for pile buildup to 30,000 units—normal roundwood storage. Average weekly consumption of the mill is 10,000 cords of hardwood and pine pulpwood fiber. Purchased pine chips, the only kind stored outdoors at CZ, account for 18% of the total.

How do these basic chip storage statistics compare with those of other mills?

A veteran Southern mill installed a new system of pine roundwood handling, debarking and chip storage in July, because, it said, the old one was obsolete. But along with the new roundwood system, OCS was instituted.

Percentage of pine chips stored outdoors here is about the same as at the CZ mill—18%. However, average weekly consumption is lower—7,500 cords. Between 10,000 and 15,000 units will provide a surge point between woodyard and digester.

The Weyerhaeuser Co.'s Plymouth (N.C.) pulp division—scene of the first large-scale move to chip storage in the South—had accumulated 18,600 chip units in storage outside through mid-year. This was slightly more than pro-

duction needs. The company attributed the surplus to more efficient and steadier operation of roundwood handling, debarking and chipping equipment during the time chips were piling up. Advocates of OCS say this substantiates their claim that handling pulpwood in chip form cuts costs over the slower crane method of unloading trucks or railroad cars.

In one of its own tests at Plymouth, Weyerhaeuser determined that one man in an eight-hour shift could handle 450 cords with a blade dozer, while, during the same period, a crane operator could handle only 250 cords.

The amount of chips in storage at Weyerhaeuser now is more than half the old roundwood inventory of 40,000 cords.

At the newest installation to incorporate OCS—Tennessee River Pulp and Paper Co.'s Counce (Tenn.) mill—maximum total inventory is estimated by the company at 25,000 units. The mill chips roundwood on arrival and sends it to storage. Only a small amount of chips is purchased.

Ideal specifications of chip piles haven't been precisely determined. The same holds for base materials and rotation schedules for the pile. At present, these factors vary considerably among mills. After more facts are in, mill officials say, econo-



feeder type (below). Both basins deposit chips onto conveyors that connect to pneumatic pipe systems.

mies of land and equipment probably will still be variables differing from mill to mill.

Average pile height in a 160,000-sq.-ft. storage area at CZ is 50 ft. Based on a maximum storage of 30,000 chip units, storage per acre is 8,174 units. Chips are piled on a 12-in. compacted clay base.

At the long established Southern mill referred to, pile height eventually will be 25 to 30 ft. Storage area is 150,000 sq. ft. A large portion of a 12-in. base layer of chips is from an original test pile put down in May, 1960.

Piles at Weyerhaeuser average 55 ft. and are stored in a 154,000-sq. ft. area. The storage volume-per-acre ratio is 6,780 units.

Separate storage areas for oak and mixed hardwood, gum and soft hardwood, and pine, total 188,000 sq. ft. at Tennessee River. Average pile height is 40 ft. Chip units stored per acre are 5,794. Blacktop and sand have been used successfully for base layers. Some mills report sand easier to separate from chips than blacktop, which is difficult to break up.

Rotation of the pile still is a controversial question. It has not been fully determined yet whether rotation has any great benefit on maintaining chip and pulp quality. CZ rotates its

chip piles at least every 120 days, and preferably every 90 days. The unnamed mill has a 10 to 15 day rotation schedule. Weyerhaeuser can maintain a 60-day schedule; and Tennessee River, a 10-day schedule. In the average operation, as much as half the dozer operator's time is delegated to rotating the pile.

Deterioration probably is the greatest problem in outside chip storage. Possible sources of contamination, uncovered in a test pile at St. Regis Paper Co.'s Fargo (Ga.) woodlands station, include: a green fungus, appearing after a month mostly on the surface of the wood; and a dark stain, appearing on the chips after two months. Fungus activity leading to deterioration is most prevalent in the sloping sides of the pile.

It is generally felt that compacting the pile makes it less subject to deterioration. Forest Service studies show that fungi actually are suppressed in the interior of a pile.

Fly ash and other mill wastes can damage chips, although to what extent is not known completely. CZ has located its chip piles 1,400 ft. from its mill. However, the company says, some contamination still has resulted. At Weyerhaeuser, chips travel in pipes 50 ft. above the ground to three discharge points 150 ft. apart, the last 450 ft. from the mill. Mill management reported no visible air contamination in chips 100 days old. The company currently is calculating turpentine and tall oil yields.

Tennessee River reports no contamination harmful to pulp quality. Brightness has remained high and moisture content uniform for several months, the company says.

Mills that purchase chips assume an additional and obvious precaution to prevent contamination: chip carriers have to be clean units.

Standard hopper cars with extended wood or steel sides only are assigned for chip handling at CZ. Car shaking equipment unloads chips into a pit from which they are conveyed to storage. Trucks averaging seven chip units are unloaded after weight scaling from a 50-ft., 100-ton capacity dumping ramp.

At most mills, chips are moved to storage by metering them into a pneumatic air stream from a rotary, drum-type star valve, usually about 30 in. in diameter. Chips travel to discharge areas under pressure varying from 2 to 7 psi, depending on pipe size, length and capacity. Some setups permit delivery of chips by alternate line to digester, if storage lines break down. Standard specifications for blowers in systems operating now are 14,500 cfm capacity with 450 hp at

1,800 rpm, mill managers report.

Elevated supply pipes at Weyerhaeuser's mill are part of a permanent structure which eliminates use of portable ground pipes, usually in 20-ft. lengths, which are moved by dozer at the other mills.

Control of the Tennessee operation differs from that at other mills. Chips first are stored in a surge tank, 16 ft. in diameter. Next, they are metered onto a plate feeder, 14 ft., 6 in. in diameter. Chip flow is maintained at 70 units per hour. Vital to the entire operation is a level indicator inside the surge tank, which automatically begins shutdown of the woodyard system when the tank approaches capacity.

Chip recovery at all OCS mills is fairly standardized, too. Most operations have two plate feeders which, of course, up capacity, and facilitate pile turnover and assure stable digester supply. CZ effects chip recovery with the same chip blower and star feeder it uses to send chips to storage.

At CZ, chips fall from feeders onto an underground rubber conveyor, 30 in. wide. The belt carries chips about 580 ft. to pipes which end at a mill-room 1200 ft. away.

The second mill distributes chips from two plate feeders onto a 36-in. rubber belt housed in an 8-ft.-by-8-ft. concrete tunnel which extends 1,100 ft. to the woodroom.

Weyerhaeuser utilizes three plate feeders, 14 in. in diameter, and spaced 150 ft. apart.

Plate feeder recovery "pits" are built up from the base layer a minimum of 12 in. at most outside chip installations. This minimizes scooping onto disc extraneous materials, which could contaminate the pulp mixture.

At Tennessee River, pits are edged with 30-ft.-by-10-ft. steel plates pitched at 45°. Four drag chains convey chips to a nearby rubber belt which travels at 250 fpm to storage silos, one with a pine chip capacity of 325 units, the other with a 135-unit hardwood capacity.

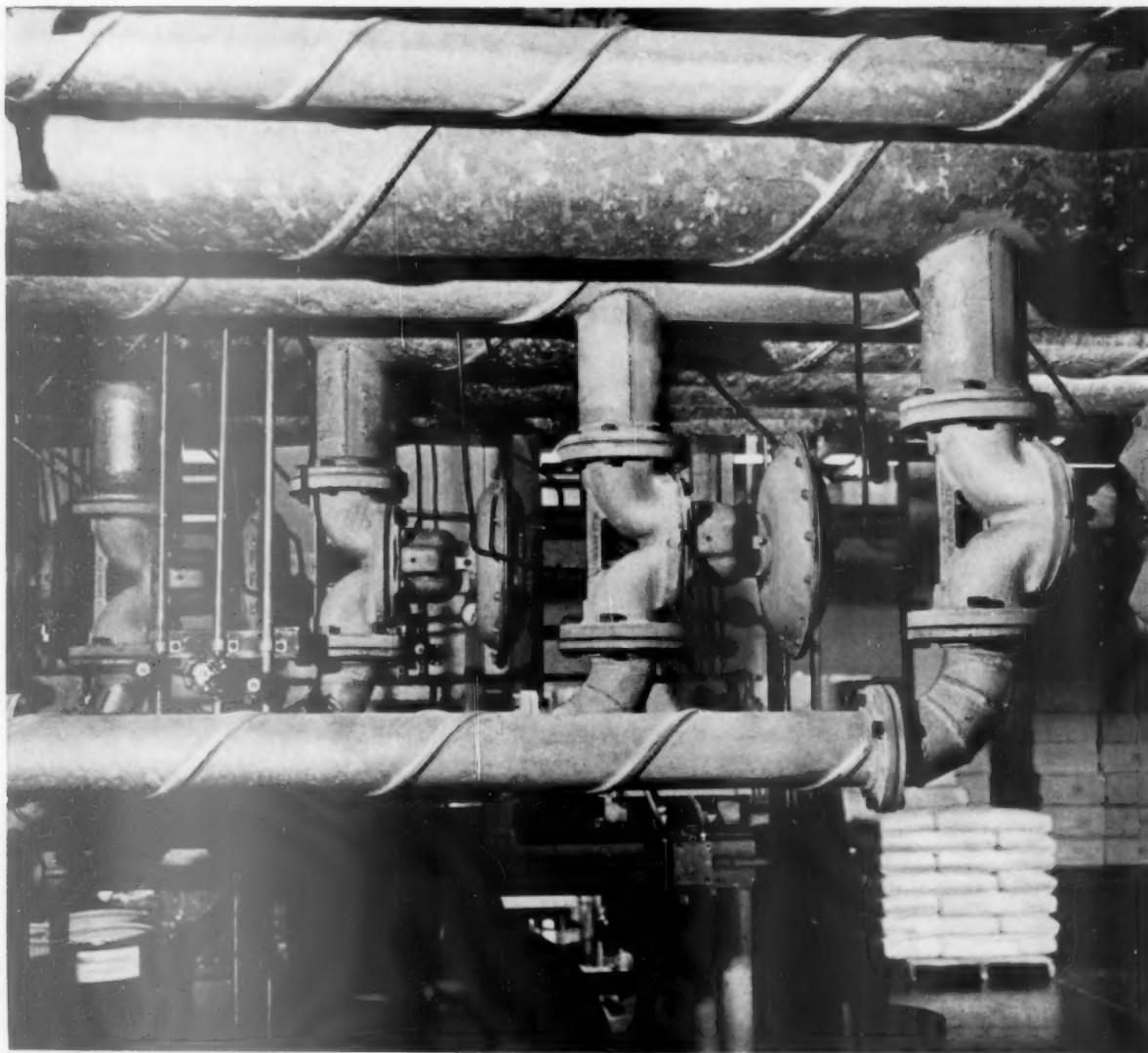
Standard equipment for pile handling is a crawler tractor with a scoop-type blade. Tractors usually are equipped with electric lights and canopy for round-the-clock, all-weather operation. To more efficiently handle pipes, a boom is mounted on tractor blade at some mills. Most tractors push about two chip units per run.

The case for outside chip storage is still being proved—or disproved. Facts to date indicate the system can increase wood efficiency and utilization and decrease handling costs inherent in the five-foot roundwood log. ■

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start p. 35 . . . ping container divisions, Cincinnati, Ohio, and Anderson, Ind.

William Lucas has been named paperboard sales mgr., Sutherland division, KVP Sutherland Paper Co., Kalamazoo, Mich. He will also manage sales for a subsidiary, the Fort Orange Paper Co.



William F. Conner has been appointed national accounts sales mgr., Mead containers division. He will continue in his post as asst. gen. sales mgr. . . Francis L. Schakelford Jr. replaces John A. Turner as Chicago district sales mgr., Du Pont's dyes and chemicals division. Mr. Turner had been at the Chicago office all but one of his 42 years with the company. . . A. R. Downing has been appointed supervisor of development, Swenson Evaporator Co. division, Whiting Corp., Harvey, Ill. A. C. Patsavas succeeds Mr. Downing as mgr., spray dryer dept.

Dr. Martin C. Mathes has been appointed to the biology dept., The Insti-

tute of Paper Chemistry, Appleton, Wisc. He will work in the area of forest genetics. . . Burt L. Kassing, formerly resident mgr., Nekoosa-Edwards Paper Co., has been transferred from Potsdam, N.Y. to Port Edwards, Wisc. . . Fred P. Lodzinski has been named a research chemist, N-E. . . Ivan Guskov, research engineer, Continental Can Co., has been transferred to Chicago. He was at Mt Vernon, Ohio. . . Clark R. Hayner now is senior research engineer, CCC. . .

Harvey G. Gendreau succeeds Raymond J. Mitchell as sales mgr., Chicago district office, Sandoz, Inc. Mr. Mitchell now is sales mgr., N. Y. office. Mr. Gendreau was in New York sales.



John Daly and Lewis Humberstone have been appointed to Midwest sales, Cameron Machine Co., Dover, N.J. Mr. Daly has been asst. sales mgr., and Mr. Humberstone had been with the company's Canadian subsidiary.

Theodore M. Gilbert, president of the

Gilbert Paper Co., died Sept. 24. Mr. Gilbert joined the company in 1923, after being graduated from the University of Wisconsin. He became president in 1954. Gilbert became a subsidiary of The Mead Corp. in September 1960.

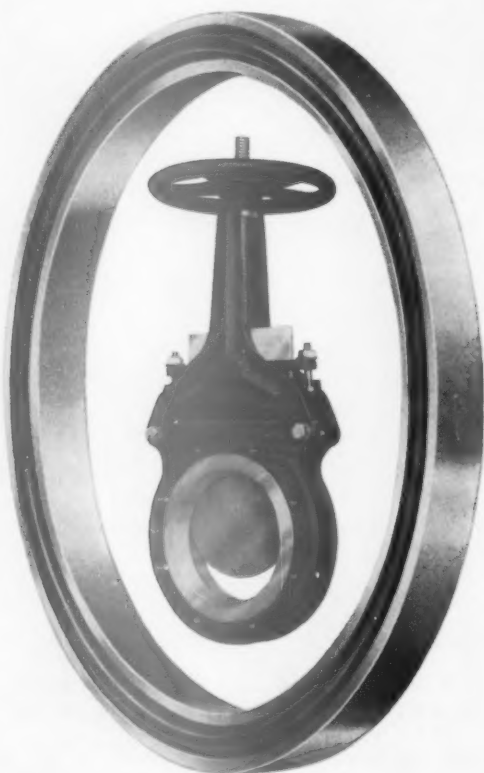
East

Charles D. Dickey Jr., vice president, Scott Paper Co., has been elected to the company's board of directors. He replaces Stanley Resor who has resigned.



Daniel E. Lucas has been appointed Eastern regional sales mgr., Corn Products Co. He was in the technical service dept., and replaces Clyde D. Woodburn, now Philadelphia district office mgr.

F. Guild Devere has been appointed gen. sales mgr., consumer products, Standard Packaging Corp. He was gen. mgr., decoware and metal specialties div., Continental Can Co. . . Philip C.



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Photo of Mount Hood, Oregon from Ewing Galloway, New York City



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Hugo Jr. has been transferred to the Pittsburgh sales office, Mosinee Paper Mills Co. Raymond F. Garneau, formerly with kraft sales, St. Regis Paper Co., will take over Mr. Hugo's territory from the company's Stamford, Conn. office . . .

Douglas L. Andrews has joined the P. H. Glatfelter Co., Spring Grove, Pa., as a chemist, Paul W. Vanier has joined the company's engineering dept., and Charles L. Tanner III is a trainee . . . Lothrop Bartlett now is production mgr., St. Croix Paper Co. He was with Madison Mills . . . Russell K. Elston has been named technical supt., Nekoosa-Edwards Paper Co., Potsdam, N.Y.

Joseph F. Theriault, chemist, Continental Can Co., has been transferred from Chicago to Haverhill, Mass. . . . Robert M. Husband has been appointed central research mgr., Riegel Paper Corp., Milford, N.J. He was with Consolidated Paper Corp., Ltd. . . . Donald W. Bail now is asst. pulp mill supt., Great Northern Paper Co., Millinocket, Me.

Harold L. Sager succeeds Robert R. Farwell as N.E. mgr., dyes and chemicals at Du Pont . . . Charles L. Lyon, Scott Paper Co., died Sept. 20. He was mgr., corporate employee relations.



John P. Grady, formerly marketing operations director, Lily-Tulip Cup Corp., has been named to the newly created position of vice president-sales of the company.

Gordon Stephens has been appointed paper mill sales mgr., N.Y. district, J. O. Ross engineering division, Midland-Ross Corp. He was paper mill sales supervisor, Ross of Canada.



James R. Kelly has joined the sales staff, Fleetwood Chemical Co. Mr. Kelly will contact mills in the Middle Atlantic states. His most recent post was with Potlatch Forests.



Martin J. O'Leary, technologist in the Paper Section of the National Bureau of Standards Washington, D. C., died on

October 2, at the age of 68. Mr. O'Leary had served the government for 33 years, having joined the Bureau staff after 20 years in the paper industry. The author of 14 scientific publications, he was well known for his research on techniques for manufacturing new types of papers, especially those made entirely from glass fibers.

Pacific

Walter A. Salmonson, Walter A. Salmonson Co., succeeds Douglas B. Armstrong, R. T. Vanderbilt Co., as president, International Brotherhood of Migratory Peddlers, Portland, Ore. Others elected were Tom King, Asten-Hill Mfg. Co., vice president; Hugh T. Gardner, Buckman Laboratories, secretary; J. M. McCullough, Pennsalt Chemicals Corp., treasurer.

William T. Robertson is the new chairman, Southwestern division of PIMA. He replaces E. J. Cavanaugh, transferred, Fibreboard Paper Products Co.'s Port Angeles, Wash. office. Other new division officers are Orville D. Latimer, Western Kraft Corp., Richmond, Calif., 1st vice chairman; Chester T. Beals, Crown Zellerbach Corp., Antioch, Calif., 2nd vice chairman; Owen T. Reeves, Container Corp. of America, 3rd vice chairman; Hugh J. Bolger, Cameron Machine Co., Belmont, Calif., secretary-treasurer; Palmer J. Harwood, Fibreboard Paper Products Co., Antioch, and Earl J. Raney, Royal Container Corp., Santa Clara, trustees; Al Gedman, Huyck Felt Co., Mill Valley, Calif., industrial affiliate rep.

Wendell W. Moyer, formerly with Crown Zellerbach Corp., now is a consultant at Portland, Ore. . . . Harland D. Jurgensen now is with Fibreboard Paper Products Corp., Antioch, Calif. He was with North Carolina Pulp Co. . . . Joe V. Baughman, mgr., Weyerhaeuser Co.'s shipping container plant, Yakima, Wash. was promoted to resident mgr. He will be responsible for both sales and manufacturing. . . . John R. Parkinson, formerly technical supt., Boise Cascade Kraft Corp.'s pulp-paperboard plant, Wallula, Wash., now is technical director, Fiber Research, Seattle. He succeeds the late Edgar G. Putnam.

Preston Roy Harrington, formerly at Charlotte, N.C. for Ciba Co., Inc., has been transferred to the company's Los Angeles office where he will be in charge of laboratories.

Oliver H. Stieber, gen. traffic mgr. of Crown Zellerbach Corp. Gaylord Container Div., St. Louis, Mo., transfers to Crown Z headquarters in San Francisco

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MEAD

VOIGHT

S. W. Mead, president of Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis., accepts conservation award from L. P. Voight, Wisconsin Conservation Dept. director. The annual award of the American Assn. for Conservation Information was given to Mr. Mead for his part in Consolidated's 1959 gift of 20,000 acres to the state for a wildlife area.

Canada

Edward R. Huckman has been named gen. sales mgr., The Foxboro Co., Ltd. He had been asst. field sales mgr., U. S. sales for the past three years. He joined the company in 1927.



C. G. Convey has been assigned to the Montreal pulp sales office, Northeastern Paper Sales, Inc. Mr. Convey was with Du Pont of Canada, Ltd. before joining Northeastern.

Sir Neill Cooper-Key, M.P., and Grenville Beckett, both of London, England, K. C. Irving, pres., Irving Pulp & Paper Co., and T. R. Moore, pres., Anglo-Newfoundland Development Co., have joined the board of directors, Price Bros. & Co., Quebec City. . . Duggan Gray and other members of the sales

staff of Columbia Pulp Sales, Ltd., Vancouver, B.C., now are located in Montreal. Mr. Gray was based in Vancouver for the past three years.

C. S. Williams, after more than 17 years with the company, has retired as purchasing agent, Marathon Corp. of Canada, mill div. . . Gordon Gear has been appointed mill engineer at the Grand Falls mill, Anglo-Newfoundland Development Co. . . Don Bogue is the new mill engineer, Donnacona Paper Co., succeeding John Langley, now an assistant mgr., Cornwall div.

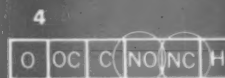
John J. Dupuis has been appointed supervisor of mill services, St. Lawrence Corp., a subsidiary of Dominion Tar & Chemical Co. based in Montreal. He joined St. Lawrence after several years with Consolidated Paper Corp. DeG. Loranger, formerly with the Canadian government in Quebec, has been named supt. of personnel for St. Lawrence, and H. S. Macdonald, paper mill supt., for St. Lawrence since 1945, is now gen. supt. He joined the company in 1934.

Allan F. Buell, vice pres., woodlands, the E. B. Eddy Co., has been appointed a director of that company. Norman D. Bennett, formerly assistant vice pres. sales, the E. B. Eddy Co., has been named director of sales. Named as a new

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**Another Mount Vernon Dryer
Felt Success Story . . .**

Mount Vernon was asked by a large Southern Kraft Mill how they could increase drying and dryer felt life expectancy on their #2 machine. WOODBERRY 403, a synthetic reinforced full faced asbestos dryer felt, was recommended and established a new record! WOODBERRY 403 ran 166 days as against the 127 day life run of the best of previous felts used. WOODBERRY 403 yielded an increase of 30%! This style continues to give outstanding service under the severest operating conditions and repeatedly renders gratifying results.



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WOODBERRY 403 is a hot spot specialist designed to produce maximum drying efficiency and life in the toughest positions. The asbestos face of this dryer felt provides protection from the devastating high temperatures. The synthetic reinforcement adds strength and longer life by superior resistance to acids, abrasion and flex. The open construction back permits moisture to be driven off quickly, thus providing superior drying efficiency. This combination of advantages all adds up to reduced costs

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STRICTLY PERSONAL . . .

director of the company is G. E. Creber, Toronto lawyer.

Pulpwood

E. D. Davenport, has been appointed office mgr., Clatsop logging div. Crown-Zellerbach Corp., Seaside, Ore. R. H. Schaubel, timber accounting statistician, Portland, has been promoted to office mgr., CZ's Tillamook logging division . . . David L. Hall was named asst. gen. safety supervisor to work with Jack Robertson, gen. safety supervisor, headquartered at CZ's Portland office. . .

Hugo N. John has been appointed an instructor at the University of Minnesota School of Forestry. He takes over duties of Merle P. Meyer, associate forestry professor, now on a Fulbright lectureship in Norway. . . Donald P. Duncan, professor of forestry at the University, has been elected chairman, Upper Mississippi Valley Section, Society of American Foresters.

Harold W. Mutch, formerly secretary of Newaygo Timber Co., Ltd., Port Arthur, Ont., has succeeded Henry S.

Mosher who has retired as vice president and gen. mgr. of the company.

W. M. Palmer Jr. has been elected president of the Louisiana Forestry Assn. Mr. Palmer, a professional forester, is vice president of timberlands, Bodcaw Co. Other officers are W. E. Dietrich, 1st vice president; C. E. Roberts, 2nd vice president; F. E. Hernandez, 3rd vice president; W. N. Darwin, treasurer.

Fred J. Sandoz has been appointed chief forester, Longview Fibre Co., Longview, Wash. Mr. Sandoz was formerly land and logging mgr., Booth Kelly Lumber Co., and professor of forest management, logging and milling and wood utilization, Southern Illinois Univ.

Suppliers

E. S. Underwood has been named surfactants product mgr., and W. C. Calvert Jr. has been appointed heavy chemicals product mgr., Antara Chemicals, New York. Mr. Underwood was heavy chemicals mgr. Mr. Calvert was assist. heavy chemicals product mgr.

Galen Miller has been elected president

of Towmotor Corp., Robert L. Fairbank succeeds him as executive vice president and C. Edgar Smith, company president since 1951, now is chairman of the board of directors' executive committee. Towmotor also has promoted Daniel M. Wessman to executive vice president, Alfred H. Roth to head of advertising and sales promotion and W. L. Utley to assistant to the president.

Carl A. Hiester now is asst. adv. mgr., Pennsalt Chemicals Corp., Philadelphia. He was sales and distribution director for "Chemical Week" magazine.

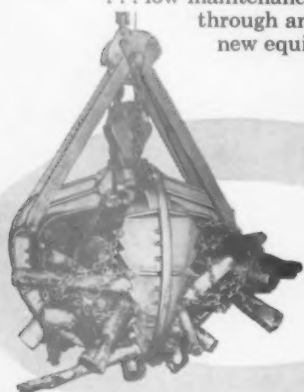


Richard W. Marshall has joined W. E. Greene Corp. as marketing mgr. He will assist in sales administration of Lodging Engineering Corp. and Stowe-Woodward, Inc.

William C. Ruch has been named director of development research, Dr. Robert W. Mason, director of laboratory research, and Charles D. Boyer Jr., director of planning research, Allied Chemical's General Chemical research laboratory, Morris Township, N.J.

Pulpwood to Paper...faster!

- Owen Pulpwood Grapples shorten the time between raw material and income-producing finished product. Reasons: bigger load capacity . . . speed of operation . . . low maintenance. Prompt service through ample inventory on new equipment and parts.



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For TOP and BOTTOM SLITTER KNIVES
SCORING KNIVES and SEGMENTS
SEMI and FULL Automatic



GUARANTEE:

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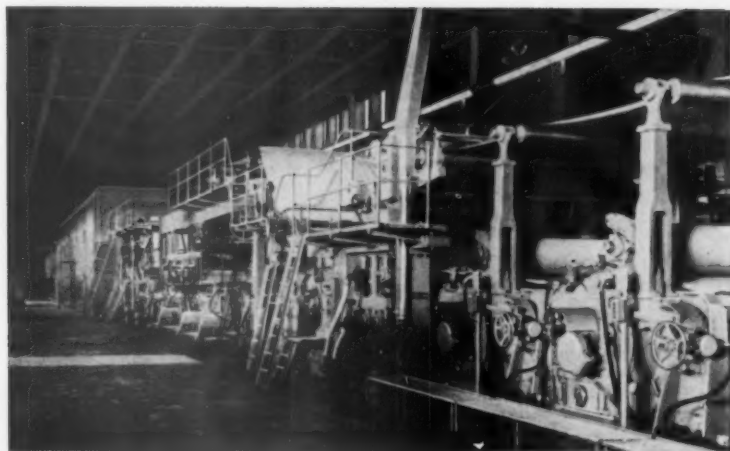
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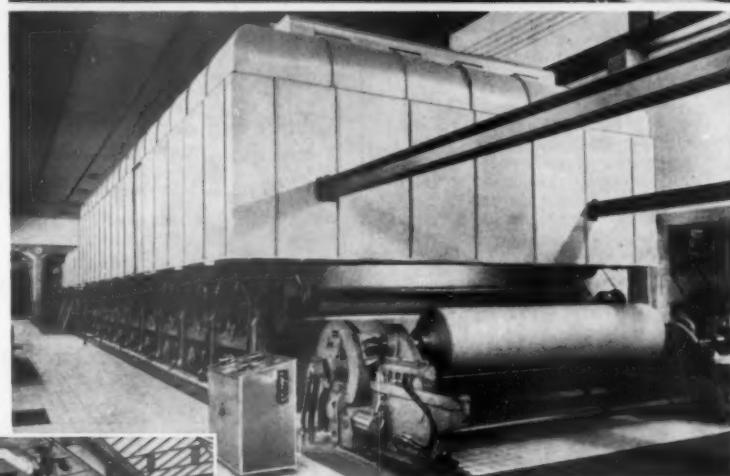
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Meet Huyck's
DAVE ELLIOTT



Dave Elliott is Manager of Huyck's Customer Service Laboratory. After joining Huyck in 1959, he worked for more than a year as Size Control Engineer at our Aliceville, Alabama plant. Since that time, he has received practical experience as a Field Service Engineer and has helped solve many customer problems associated with felt cleaning.

A native of the Deep South, Dave is a Chemical Engineer from the University of Alabama. In his present assignment, he makes good use of this technical training and practical know-how to direct the activities of his group—the largest and best equipped laboratory team in the industry serving papermakers exclusively.

HUYCK FELTS

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NEW EQUIPMENT...

starts on p. 31 . . . distributed powder layer. Nozzle is directed to one face or area of the surface being coated. Subsequent heat processing or baking firmly bonds the powders, the company says. Emerging coating particles are electrically charged and deposited only on an object within a created electric field. The "Stajet" delivers 90,000 volts, and current up to 0.2MA. The gun has an anti-sparking head.

Voltage is essentially constant at all spraying distances. Current adjusts automatically based on powder flow. Power consumption is 100 watts.

Supplier: Sames, 30 Broad St., New York, N.Y.

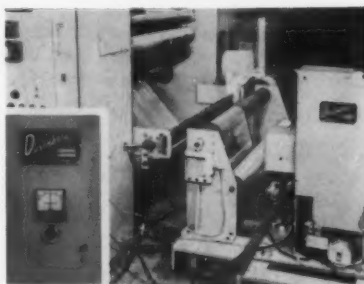
Splitter-grinder ... with fast sharpening

Applications: For paper converting operations.

Features: This hydraulic unit occupies 4 sq. ft. and is reported to sharpen splitter-knives within the plant, reducing down-time.

Supplier: Convertors' Machinery and Controls, Inc., 12803 Silver Spring Dr., Butler, Wis.

Continuous web tension ... with one-setting control

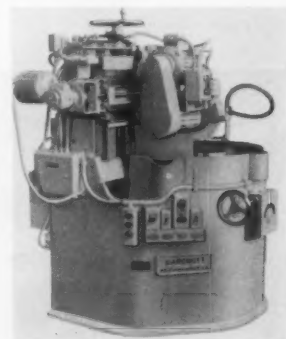


Applications: For automatic control of web tension.

Advantages: The unit can be installed at unwind or rewind ends, or at any location. Tension is relayed through a pair of load cells to automatic controls, which in turn operate a servo-valve. This adjusts brake up or down by pneumatic pressure. Only one tension setting is made.

Supplier: John Dusenbery Co., Inc., Clifton, N.J.

Slitter grinder ... for high production knives



Applications: For grinding knives used in extra high production operations.

Advantages: Grinder utilizes 12 in. wheel, mounted on a precision spindle. The 3 hp. motor is fully balanced, the company says, and all supporting parts are heavy duty for support of the grinding head assembly. Down feed, cross feed and oscillation have automatic motor drives.

Supplier: Hanchett Mfg. Co., Big Rapids, Mich.

U.S. Rubber

has placed in operation a large conveyor belt tester in its Passaic, N.J. plant. The machine is electronically controlled, weighs 100 tons and is 65 ft. long. It can test belts up to 140 ft. long at speeds up to 2,000 fpm. The unit will enable U.S. Rubber to test a variety of conveyor belts.

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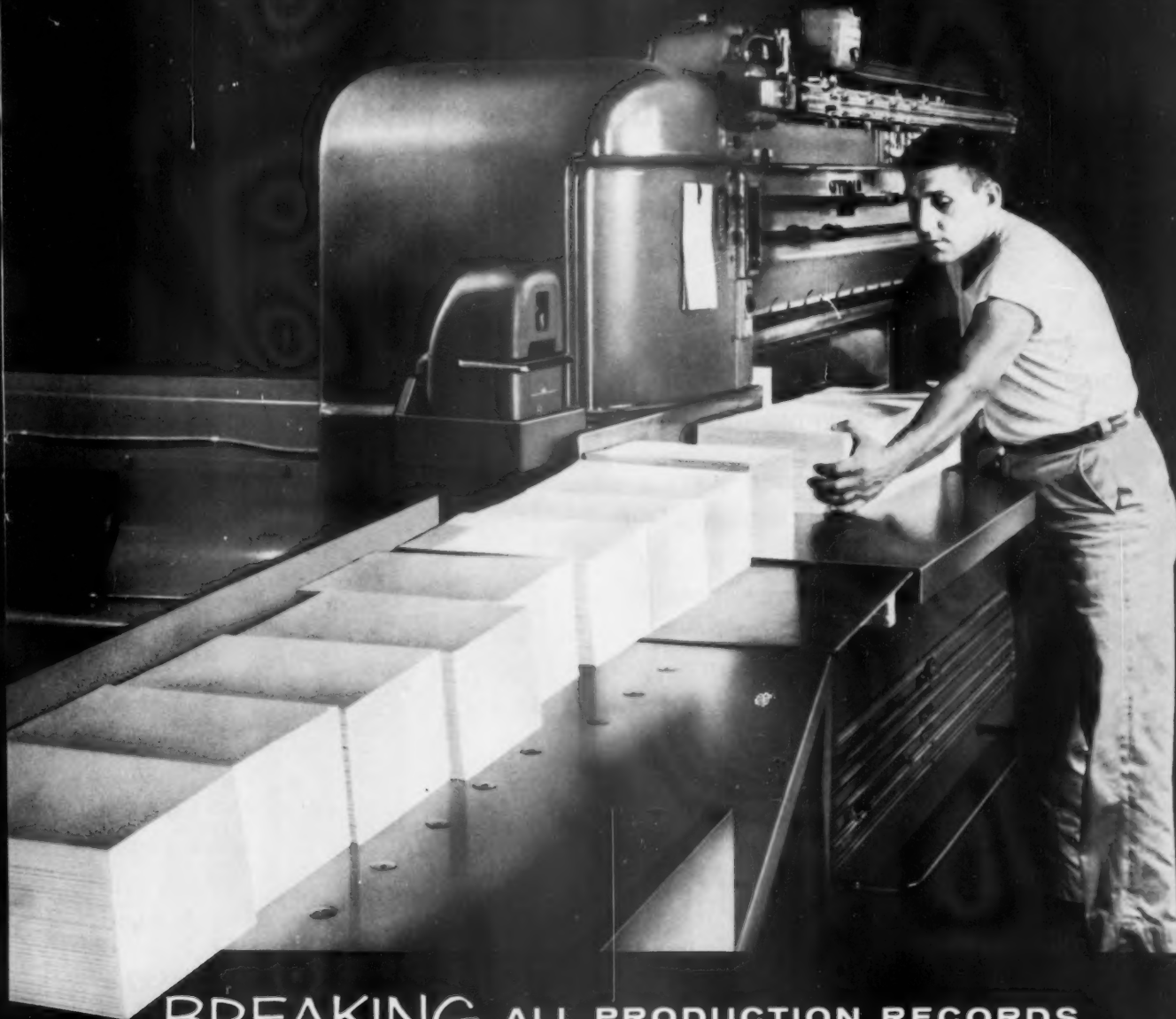
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Provide your customers with paper products that give quick, complete release from the stickiest materials — save time and money.



Dow Corning

For more information write Dow Corning Corporation,
Department 7022, Midland, Michigan



BREAKING ALL PRODUCTION RECORDS...

SEYBOLD 65", 85", AND 100" FULL-HYDRAULIC CUTTER-TRIMMERS

You're looking at one of the Seybold Full-Hydraulic cutter-trimmers that is setting new standards of production and accuracy in leading paper mills and commercial finishing departments throughout the country.

The reason? Operators from major mills spell it out like this:

- Full-hydraulic control of knife bar, clamp and back gauge is the smoothest, fastest cutting combination ever.
- Seybold exclusive Auto-Spacer positions precisely every time, permits full concentration on loading, cutting, and unloading.

- Air-film table takes the backbreak out of paper handling, reduces fatigue, boosts production.
- New table-slot closing device multiplies advantages of backloading, permits uninterrupted work flow.

These are only a few of the reasons. Call your Harris-Seybold representative for the full story. Ask to see the Seybold Full-Hydraulic story—"Accuracy by the Carload"—our fast-moving, 18-minute color film. You owe it to your competitive position.



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Which coating suits you best? There's



a DOW COATING to fit almost any paper need!



Among the many fine Dow products, you'll find paper and boxboard coatings for almost every application. Here is a partial list of the Dow products which serve the pulp and paper industry:

NEW DOW LATEX 630 . . . Coatings made from this styrene-butadiene latex offer demonstrably superior pick resistance, excellent mechanical stability and starch compatibility. Dow Latex 630 will produce a smoother, more uniform paper surface, providing maximum printability. Both type and half-tone reproductions will be sharp and clear, with a minimum of production problems.

DOW SARAN RESINS . . . For highly protective coatings offering reduced moisture vapor transmission and permeability to gases, and improved grease and oil resistance, select Dow saran resins. They can upgrade packaging films, paper and paperboard for use in many new applications.

SARAN LATEX F-122 . . . This aqueous solution of saran dries to form a continuous, tough, glossy film with high resistance to chemicals and water. Use it for decorative coatings and book bindings.

DOW POLYETHYLENE . . . A wide range of resins is available for extrusion coating and lamination of paper, paperboard and flexible packaging webs. They offer excellent gloss and heat sealing properties, as well as good water vapor, water and chemical resistance. Flexibility is maintained at low temperatures.

ETHOCEL® . . . This organo-soluble cellulose plastic is compatible with many waxes, resins and plasticizers. Coatings made of Ethocel are noted for heat stability and for solubility in low cost solvents.

To solve your coatings problems, call on Dow. You'll find not only a wide selection of products, but experienced technical assistance in their use. For information, write us in Midland, Coatings Sales Department 1932JJ10-2.

THE DOW CHEMICAL COMPANY



Midland, Michigan

LITERATURE . . .

Pneumatic Steelstrapper

that tensions, seals and cuts strapping is a fully-powered, air-driven hand tool. Photos in booklet AD-251 show the unit in operation. Strapping techniques are included. Accessories for custom engineering the tool into a system also are shown.

Write: Acme Steel Co., Acme Steel Products Division, 135th St. and Perry Ave., Chicago 27, Ill.

Ceramic cones

for pulp cleaners are described in this new bulletin, P-37. The company says the cones were developed specifically to overcome excess wear caused by abrasive pulps.

Write: The Bauer Bros. Co., Springfield, Ohio.

Clamshell buckets, grabs

and grapples are described with relative data and other general information in this new 50-page catalog. Tables show relationships of bucket weights to material weights and crane sizes.

Bulletin 21-60; Erie Strayer Co., Rudolph Ave., Erie, Pa.

Automated materials handling

is described in management-oriented bul-

letin GEA-7130. It describes five major functions of the system—identity, dispatch, store, recall and deliver—and applications.

Write: General Electric Co., Schenectady 5, N.Y.

Complete guide to sealing

has been developed especially for the pulp and paper industry to provide recommendations and information on sealing applications in all phases of mill operations. The guide, covering mechanical packings, shaft seals, pipe joint and gasket compounds, is bound in sections and a reference guide chart covering all types of equipment in which seals and packings are used is included. Copies may be obtained from Crane Packing Co., Dept. Pr-6, 6400 Oakton St., Morton Grove, Ill., or Box 134, Station C., Hamilton, Ont.

Air pollution

control unit promotes more complete combustion of fuels such as coal and oil, and eliminates, according to the company, almost all smoke, soot, scale deposits and stack emissions.

Write: Harco Chemical Co., 338 North Ave. E., Cranford, N.J.

CHEMICALS . . .

Aluminum-paper adhesive

called "Rubbatex" is water based and can be applied by a conventional coating machine, flow gun or spray gun. The laminating chemical dries transparent and is non-staining. Only one-side wet application is required to bond aluminum to paper. When dry, heat will form a permanent bond, the company says.

Supplier: Rubba, Inc., 1015 E. 173rd St., New York, N.Y.

Glossy coatings

with low friction coefficient are produced with this new polyethylene. The formulation contains a slip additive which, the company says, withstands melt temperatures up to 600° F in extrusion coating. This eliminates matte finish, dusting or spraying which dull finish of coated paper. Other properties include uniform drawdown, low edge variation and good adhesion, the supplier says. Nominal melt index is 3.5. Nominal density is 0.921. The formulation is especially advantageous for coated paper that is eventually fabricated into glossy cartons and pouches on high speed packaging machinery.

Supplier: Eastman Chemical Products, Inc., 260 Madison Ave., New York 16, N.Y.



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560 E. Clarendon St.
Gladstone, Oregon

Increase Paper Production with DUPASQUIER DRIPLESS STEAM SHOWER BOX

- Preheats the Web
U. S. patent 2,838,982.
 - Changes Water Viscosity
THUS FREEING WET MAT
 - Allowing Speed Increase
Custom Built for Any Machine
Write for Illustrated Folder
- Canada Pat. 1955
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Improved dry strength

and wet end properties of paper products result from a new resin "Mydel 550" a copolymer of acrylamide and acrylic acid, is claimed particularly effective on board chemical pulps and groundwood pulps. Increase in burst and improvements in tensile, fold and pick were shown in tests, the supplier says. Mechanical pulp dry strength was improved in mixtures above sulfite-groundwood ratio of 50%. The company says its product also improves fiber and filler retention, rosin retention and wet web strength.

Supplier: The Dow Chemical Co., Abbott Rd. Bldg., Midland, Mich.

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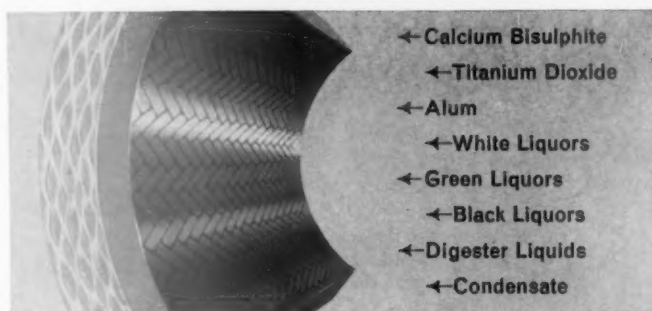
How? Many ways. For example, in most areas, you can order 73% Mathieson caustic soda by truck. The benefits to you are obvious. This concentrated solution means fewer deliveries, less shipping weight, less transportation cost. And only Olin Mathieson offers you this convenient truck delivery.

More ways Mathieson squeezes delivery costs? Location. Mathieson has eight producing plants and shipping points (with a ninth under construction) covering the industrial South and East, with barge, rail or truck shipments to suit your needs.

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CHEMICALS DIVISION **Olin**



CORROSION-RESISTANT TO CHEMICAL ATTACK—Used in many of the major paper and pulp plants, Fibercast now has proved itself to be a corrosion-free, non-contaminating piping system. It has outstanding ability to withstand damaging, corrosive liquids under high pressures and temperature extremes.

FIBERCAST® pipe combats critical corrosion problems in the paper industry!

- *Copes with temperature range from -65° to $+300^{\circ}$ F.*
- *Withstands operating pressure range to 1200 psi.*
- *Handles 320 of the hottest 338 corrosive solutions.*
- *Available in pipe sizes from 2" to 8" with fittings.*

Heat, pressure, and corrosion failures can cost your paper mill money—in downtime, intermittent tubing replacements, high costs for new materials and labor.

That's why it is important for you to evaluate the solid cost-cutting protection you get with Fibercast pipe. Fibercast solves your piping problems better than any other tubing. Even more expensive pipe, or pipe with thermoplastic interior coatings cannot match Fibercast's resin-rich interior.

The "hot" acids, liquids and other corrosive solutions, unique to the pulp and paper industry have negligible effect on this rugged pipe. Whether used in dryer drainage systems, reaction tower installations, or in carrying such solutions as calcium bisulphite, Fibercast proves long-lasting, safe, efficient.

The Secret of Long Service Life
Fibercast owes its long service life—and its special resistance to heat, pressure, corrosion and contamination—to the exclusive way it is built. Fibercast is a centrifugally cast thermoset epoxy reinforced pipe with multiple layers of seamless braided glass fiber sleeving or especially woven glass fab-

ric. A body of woven glass fibers, impregnated with epoxy resin chemically cured at elevated temperatures, gives Fibercast its outstanding ability to withstand high pressures and temperatures in corrosive environments.

COMPARATIVE LIFE DATA*

FIBERCAST, GRADE J	1.00
ALUMINUM	.26
BRASS (RED)	.74
RUBBER HOSE	.210
STEEL (Stainless 304-40)	.311
ASBESTOS (Cement-C-100)	.237

*Basing Fibercast as unit life of 1 and others as comparative percentages thereof.

Fibercast handles operating pressures to 1200 psi. It has an operating temperature spread wider than any other non-metallic pipe (-65° to $+300^{\circ}$ F.). It handles 320 of 338 (94%) known corrosive solutions.

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at LOWE PAPER CO., Ridgefield, N. J.,
famous makers of coated boxboard.

Defective sheets are sorted out of the shipping pile by a semi-automatic inspection system and a dual layboy with reject gate.

SYNCHRO-FLY® SHEET CUTTER

Distinct from conventional equipment, the "SYNCHRO-FLY"

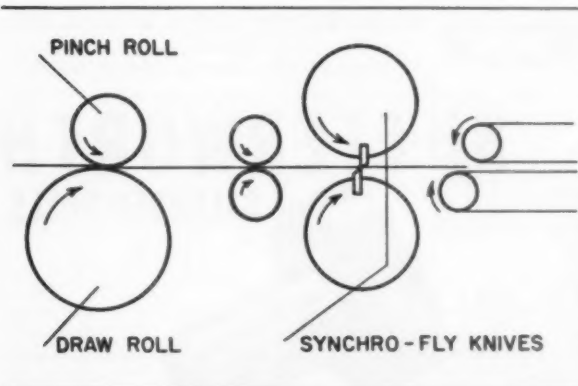
- cuts heavy multiple webs where other cutters fail
- cuts clean, sharp, cliff-like edges without fuzz
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- reduces knife changes (once a year or less)
- needs no angle corrections for sheet squaring
- operates in whispering silence.

How is this achieved? The "SYNCHRO-FLY" has no bed knife. Both knives rotate and meet the web at its exact own speed, regardless of sheet length. The web travels through the cutter in a straight line. Highest accuracy is guaranteed by use of fully enclosed, centrally lubricated precision-gears and specially designed PIVs.

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JAGENBERG USA, INC., 300 Park Avenue South, New York 10, N.Y.

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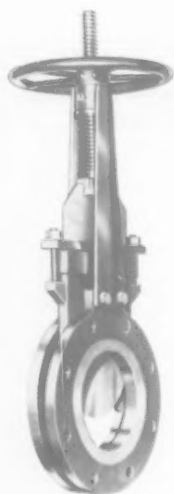
Schematic Diagram of "SYNCHRO-FLY" cutoff



"SYNCHRO-FLY" Knife Assembly



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At Butterworth, every roll is built to specification. A special process is used which assures that each Butterworth Calender Roll will provide extra hours of service on the stack and finer, smoother finishes.

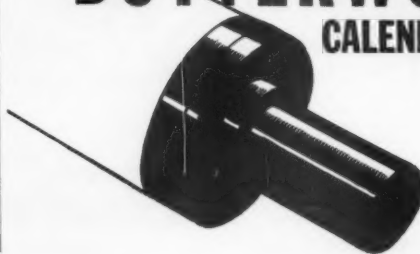
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Nopcote® C-104 is out of this world when it comes to lubricating protein, starch or latex coating colors. A fluid-stable, 50% calcium stearate dispersion, it produces a clean, dust-free coating with improved gloss—even at low calender pressures.

This lubricant improves flow and leveling characteristics to the point where a smooth, even application is possible at high speeds and on any equipment—trailing blade, roll train, air knife, or size press. It

minimizes surface pattern, too, and gives your sheet that extra increment of salability.

This mill-proven coating additive is fluid and easy to handle. Other advantages are that it has little effect on color viscosity and permits application of high-solids, quick-drying coatings.

Nopco technical representatives will be happy to supply samples of Nopcote C-104 and set up a mill trial at your convenience.

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Wax Sizes
Calender Stack
Lubricants
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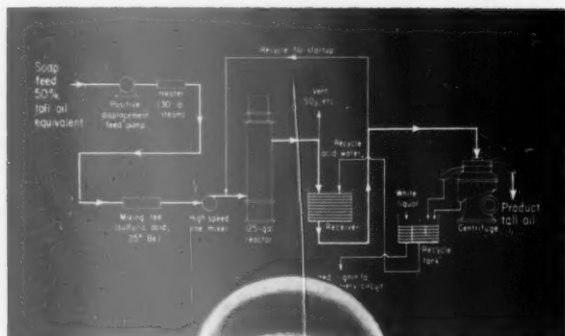
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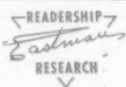
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MILLER FREEMAN PUBLICATIONS

The last word

PULP & PAPER editors on the go again

With the coming of Fall and the new round of meetings and mill visits, PULP & PAPER editors barely touch home base these days.

For instance, Editor Al Wilson, fresh from a trip with Managing Editor Vincent DeSalvo to Oxford Paper Co.'s Rumford (Me.) mill, made a month-long trip westward. Starting at the Fourth International Mechanical Pulp Conference, which he so adeptly reports in this issue, Mr. Wilson headed for Rockford, Ill., for a PIMA meeting, then on to Missoula, Mont., Seattle, Wash., Portland, Ore., and other points.

No sooner had Mr. Wilson arrived in New York, he was off again, this time to the 16th TAPPI Engineering Conference where he would serve two roles: one as editor-reporter and the other as an invited speaker at the Sanitary Engineering Session. His topic: Water problems.

Managing Editor DeSalvo, having contributed to the Oxford report (PULP & PAPER, Oct. 2, 1961) then started work on some special stories which we can't tell you about now. But they'll be coming your way soon.

Meanwhile, Assistant Editor Pete Inserra made a quick trip to Galt, Ont., to report first-hand on a new line of trimmers (PULP & PAPER, Sept. 18, 1961). Next he was off to Scott Paper Co.'s new outside chip storage plant at Winslow, Me.; to write an on-the-spot account of these new facilities, which, we understand, cost about \$2 million. His report will be featured soon in PULP & PAPER's Pulpwood World.

Thanks to excellent contacts

which he had maintained, Western Editor Louis H. Blackerby, was able to "nose out" a scoop on new developments in groundwood-from-chips. Mr. Blackerby had known about this development for more than a year, had honored a confidence until everyone concerned was satisfied with the system.

Mr. Blackerby has also come through with a timely report on Western outside chip storage facilities, which will be published soon in PULP & PAPER.

Meanwhile, back in the South, Southern Editor Bill Diehl is trying to catch up since his six-months sojourn in New York, where he worked on development of the "new" PULP & PAPER. The Southern Exposure will soon be reported on in the cogent, colorful style of the inimitable Bill Diehl.

Some insight into Canadian thinking on future newsprint capacity and how Canadians feel about the United Kingdom entering the Common Market are reported and explained in this issue by Canadian Editorial Director Charles L. Shaw.

Timeliness and significance are the watchwords at editorial headquarters here in New York City. Examples: Pulpwood managers say outside chip storage is of paramount interest right now. The South, especially, is interested and through the cooperation of the American Pulpwood Assn., we are privileged to present in this issue some operating results of several Southern installations.

Incidentally, the term OCS (outside chip storage) was coined by Staffer Inserra.

Groundwood—Today and Yesterday

In the old days mechanical pulping was the segment from which very little was expected. It was sitting quietly in the corner, while the other pulping processes were showing off.

Groundwood pulping still has not changed much in 100 years.

But in Chicago from Sept. 18-20, this "Cinderella" of this industry had her big party. An international galaxy of experts showed there is a lot of possibilities for revolutionary changes in mechanical pulping.

The distances were as fiery as any

heard in papermaking or chemical pulping meetings. And the new ideas for refining groundwood from chips (see PULP & PAPER, Sept. 18) created quite a stir. A steel wheel used in Canada shows promise, also, of being an instrument for groundwood production or at least for producing more valuable knowledge of the groundwood process. Sometimes the papers were very "long hair". But, amazingly, this didn't put the delegates to sleep. Nearly every discussion period had its share of fireworks.

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